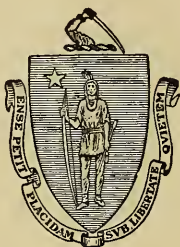


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MASSACHUSETTS
AGRICULTURAL COLLEGE

CATALOGUE, 1923-1924



MASSACHUSETTS
AGRICULTURAL COLLEGE
AMHERST
MASS.

THE M. A. C. BULLETIN
AMHERST, MASSACHUSETTS

VOLUME XVI JANUARY, 1924 NUMBER I

PUBLISHED EIGHT TIMES A YEAR BY THE MASSACHUSETTS
AGRICULTURAL COLLEGE: JAN., FEB., MARCH, MAY,
JUNE, SEPT., OCT., NOV. ENTERED AT THE POST
OFFICE, AMHERST, MASS., AS SECOND CLASS MATTER

THE SIXTY-FIRST ANNUAL REPORT OF THE
MASSACHUSETTS AGRICULTURAL COLLEGE

PART II.—CATALOGUE OF THE COLLEGE FOR
1923-1924



PUBLICATION OF THIS DOCUMENT
APPROVED BY THE
COMMISSION ON ADMINISTRATION AND FINANCE

The Commonwealth of Massachusetts.

DEPARTMENT OF EDUCATION,
STATE HOUSE, BOSTON, October 26, 1923.

To the Honorable Senate and House of Representatives.

GENTLEMEN:— In accordance with the provisions of Section 32 of Chapter 30 of the General Laws, I transmit to you, herewith, for the use of the General Court, Part II of the Annual Report of the Massachusetts Agricultural College for the year ending November 30, 1923.

Respectfully yours,

PAYSON SMITH,
Commissioner of Education.

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, MASS., November 30, 1923.

To the Commissioner of Education.

SIR:— On behalf of the trustees of the Massachusetts Agricultural College I have the honor to transmit herewith Part II of the sixty-first annual report of the trustees for the fiscal year ended Nov. 30, 1923, this being the catalogue of the college.

Respectfully yours,

KENYON L. BUTTERFIELD,
President.

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Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

This issue of the catalogue represents the status of the college for the current college year, with provisional announcement of courses of study and other matters for the year to follow. When deemed necessary, additional announcements are made in a supplementary bulletin, published in the spring.

The college reserves, for itself and its departments, the right to withdraw or change the announcements made in its catalogue.

SEP 20 1926

CALENDAR.

1923-1924-1925.

REGULAR AND TWO-YEAR COURSES.

1923.

September 26, Wednesday, 1.30 P.M.		Fall term begins; assembly.
October 12, Friday		Holiday, Columbus Day.
November 28-December 3, Wednesday, 12 M.-Monday, 7.30 A.M.		Thanksgiving Recess.
December 21, Friday, 5 P.M.		Fall term ends.

1924.

January 2, Wednesday, 7.30 A.M.		Winter term begins; assembly.
February 22, Friday		Holiday, Washington's Birthday.
March 14, Friday, 5 P.M.		Winter term ends.
March 18, Tuesday, 7.30 A.M.		Spring term begins; assembly.
April 19, Saturday		Holiday, Patriots' Day.
May 30, Friday		Holiday, Memorial Day.
June 7-9, Saturday-Monday		Commencement.
June 19-21, Thursday-Saturday		Entrance examinations.
September 17-20, Wednesday-Saturday		Entrance examinations.
September 24, Wednesday, 1.30 P.M.		Fall term begins; assembly.
October 13, Monday		Holiday, Columbus Day.
November 26-December 1, Wednesday, 12 M.-Monday, 7.30 A.M.		Thanksgiving Recess.
December 19, Friday, 5 P.M.		Fall term ends.
December 30, Tuesday, 7.30 A.M.		Winter term begins; assembly.

1925.

February 23, Monday		Holiday, Washington's Birthday.
March 13, Friday, 5 P.M.		Winter term ends.
March 17, Tuesday, 7.30 A.M.		Spring term begins; assembly.
April 20, Monday		Holiday, Patriots' Day.
May 30, Saturday		Holiday, Memorial Day.
June 6-8, Saturday-Monday		Commencement.
June 18-20, Wednesday-Saturday		Entrance examinations.
September 23-26, Wednesday-Saturday		Entrance examinations.
September 30, Wednesday, 1.30 P.M.		Fall term begins; assembly.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was organized under the national land grant act of 1862. This legislation is also known as the Morrill act, the original bill having been framed by Justin Smith Morrill, Senator from Vermont, and its final enactment secured under his leadership. It provided that public lands be assigned to the several States and territories, the funds from the sale of which were to be used to establish and maintain colleges of agriculture and mechanic arts. The Massachusetts Agricultural College was among the first of these institutions established. When this act was passed the Massachusetts Institute of Technology was already organized, and the State of Massachusetts decided that the instruction in the mechanic arts should be at the institute, and that the new institution should confine its work to agriculture. On this account the Massachusetts Agricultural College has the unique distinction of being the only separate agricultural college in the country.

In 1863 the State of Massachusetts accepted the provisions of the Morrill act and incorporated the Agricultural College. The location at Amherst was selected only after long and careful study by the original Board of Trustees. The college was formally opened to students on the 2d of October, 1867, with a faculty of four teachers and with four wooden buildings.

The Massachusetts Legislature has granted money for the erection of practically all of the buildings now on the grounds. In view of the fact that the annual income from the original endowment has been only a few thousand dollars, it has been necessary for the State to assume large responsibility for the current expenses of the institution.

ORGANIZATION. — The college is a State institution, serving in the Department of Education and as such is subject to the laws governing and the rules applying to all State departments and institutions. The work of the college is directed by a board of sixteen trustees. Four of these are ex-officio members, — the Governor of the State, the Commissioner of Education, the Commissioner of Agriculture and the president of the college. The other fourteen members are appointed by the Governor for terms of seven years each, or two each year. The immediate control of the institution is vested in the president of the college. The administrative officers, having supervision of the various departments of activity, are directly responsible to the president.

In carrying out its purpose the college has organized three distinct yet correlated types of work, — namely, research, resident instruction and extension service.

RESEARCH. — Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established and supported as a department of the college. For a time, therefore, Massachusetts had two experiment stations at the college. In 1895 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the Federal government. In 1906 the Federal government largely increased its support on condition that the money thus provided should be used only for research. The station now receives about four-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees; the chief officer is the director, who is responsible to the president. It is organized into a number of

departments, all co-operating toward the betterment of agriculture. In most cases the heads of these departments are heads of corresponding departments in the college.

RESIDENT INSTRUCTION. — The college offers an education without tuition fee to any student who is a resident of Massachusetts and who meets the requirements for admission. Women are admitted on the same basis as are men. Students who are not residents of Massachusetts are required to pay a nominal tuition fee. The chief aim of the institution, through its resident instruction, is to prepare men and women for the agricultural vocations. The term "agricultural vocations" is here used in its broadest sense. Courses are offered which give efficient training in various agricultural pursuits, such as general farming, dairying, management of estates, poultry husbandry, fruit growing, market gardening, floriculture, landscape gardening and forestry. Students are also trained for investigation in many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for scientific work in chemistry, entomology, botany and microbiology.

Though training for the agricultural vocations is thus the chief concern of the college, students should find the course one that trains them admirably for pursuits in which the sciences are an essential preparation. The course of study aims also to combine an adequate general education with specialized technical and practical training.

FOUR-YEAR COURSES. — Twenty-nine teaching departments offer instruction in agriculture, horticulture, sciences, the humanities, rural social science and rural home making. A system of major courses permits the student to elect major work in one of sixteen departments, and to specialize in it and allied subjects for a period of two years. The degree of bachelor of science is granted on the satisfactory completion of the four years' work of collegiate grade.

SHORT COURSES. — In order to extend the advantages of the institution to those men and women who cannot or do not care to take advantage of the four-year course, various short courses are offered. Chief among these are a two-year course in practical agriculture, a summer school of agriculture and country life, and a winter school of agriculture.

GRADUATE SCHOOL. — The graduate school is organized to provide the necessary training for scientific leadership in agriculture and allied sciences. The degrees of master of agriculture, master of landscape architecture, master of science, doctor of agriculture and doctor of philosophy may be earned upon the completion of satisfactory study, research and thesis.

THE EXTENSION SERVICE. — The Extension Service is the organized educational agency of the college which serves the people of the State other than resident students. Its function is to make available to Massachusetts citizens useful and practical information on agriculture and home economics which is developed by the experiment station or the United States Department of Agriculture, and which is taught by the college to resident students. It is the recognized agency of the United States Department of Agriculture for teaching those who cannot attend college, and is a cooperative effort by the Department of Agriculture, the Massachusetts Agricultural College, and the County Extension Services.

The Extension Service uses many methods of work, among which are the following:

- Demonstrations.
- Publications.
- Correspondence Courses.
- Lectures.
- Exhibits.
- Extension Schools.
- Leader-training Groups.
- Boys' and Girls' Clubs in Agriculture and Home Economics.
- Agricultural News Letters.

Literature descriptive of these various services will be mailed on request. Information may also be secured from the county agricultural agents at the following addresses:

Berkshire County Extension Service, Howard Block, Pittsfield, Mass.
Bristol County Agricultural School, Segreganset, Mass.
Cape Cod Extension Service, Hyannis, Mass.
Essex County Agricultural School, Hathorne, Mass.
Franklin County Extension Service, Sheldon Block, Greenfield, Mass.
Hampden County Improvement League, 244 Main St., Springfield, Mass.
Hampshire County Extension Service, 59 Main St., Northampton, Mass.
Middlesex County Extension Service, 12 Moody St., Waltham, Mass.
Norfolk County Agricultural School, Walpole, Mass.
Plymouth County Extension Service, 106 Main St., Brockton, Mass.
Worcester County Extension Service, 11 Foster St., Worcester, Mass.

LOCATION AND EQUIPMENT. — The Agricultural College is located in the town of Amherst. The grounds comprise more than 650 acres, lying about a mile north of the village center. The college has also a demonstration forest of 755 acres, located 6 miles north of the campus. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst is 97 miles from Boston, and may be reached by the Central Massachusetts division of the Boston & Maine Railroad, or by the Central Vermont Railroad. Electric car lines connect Amherst with Northampton, Holyoke and Springfield.

MILITARY DRILL. — By Federal law military drill is required of all regular students attending the Massachusetts Agricultural College.

THE TRUSTEES.

ORGANIZATION OF 1923.

MEMBERS OF THE BOARD.

	TERM EXPIRES
FRANK GERRETT of Greenfield	1924
HAROLD L. FROST of Arlington	1924
CHARLES H. PRESTON of Danvers	1925
CARLTON D. RICHARDSON of West Brookfield	1925
DAVIS R. DEWEY of Cambridge	1926
JOHN F. GANNON of Pittsfield	1926
ARTHUR G. POLLARD of Lowell	1927
GEORGE H. ELLIS of West Newton	1927
ELMER D. HOWE of Marlborough	1928
ATHERTON CLARK of Newton	1928
NATHANIEL I. BOWDITCH of Framingham	1929
WILLIAM WHEELER of Concord	1929
CHARLES A. GLEASON of North Brookfield	1930
JAMES F. BACON of Boston	1930

MEMBERS EX OFFICIO.

His Excellency Governor CHANNING H. COX, *President of the Board of Trustees.*
 KENYON L. BUTTERFIELD, *President of the College.*
 PAYSON SMITH, *State Commissioner of Education.*
 ARTHUR W. GILBERT, *State Commissioner of Agriculture.*

OFFICERS OF THE TRUSTEES.

His Excellency Governor CHANNING H. COX of Boston, *President.*
 CHARLES A. GLEASON of North Brookfield, *Vice-President.*
 RALPH J. WATTS of Amherst, *Secretary.*
 FRED C. KENNEY of Amherst, *Treasurer.*
 CHARLES A. GLEASON of North Brookfield, *Auditor.*

STANDING COMMITTEES OF THE TRUSTEES.¹

Committee on Finance.

CHARLES A. GLEASON, *Chairman.*
 GEORGE H. ELLIS.
 NATHANIEL I. BOWDITCH.

ARTHUR G. POLLARD.
 CARLTON D. RICHARDSON.
 ATHERTON CLARK.

Committee on Course of Study and Faculty.

WILLIAM WHEELER, *Chairman.*
 ELMER D. HOWE.
 JAMES F. BACON.

PAYSON SMITH.
 DAVIS R. DEWEY.
 JOHN F. GANNON.

ARTHUR W. GILBERT.

Committee on Farm.

NATHANIEL I. BOWDITCH, *Chairman.*
 FRANK GERRETT.

GEORGE H. ELLIS.
 ARTHUR W. GILBERT.

CARLTON D. RICHARDSON.

¹ The president of the college is ex-officio member of each committee.

Committee on Horticulture.

HAROLD L. FROST, *Chairman*.
CHARLES A. GLEASON.

ELMER D. HOWE.
ATHERTON CLARK.

CHARLES H. PRESTON.

Committee on Experiment Department.

CHARLES H. PRESTON, *Chairman*.
ARTHUR W. GILBERT.

ARTHUR G. POLLARD.
HAROLD L. FROST.

CARLTON D. RICHARDSON.

Committee on Buildings and Arrangement of Grounds.

GEORGE H. ELLIS, *Chairman*.
FRANK GERRETT.
WILLIAM WHEELER.

JAMES F. BACON.
CHARLES H. PRESTON.
ATHERTON CLARK.

Committee on Extension Service.

ELMER D. HOWE, *Chairman*.
GEORGE H. ELLIS.
HAROLD L. FROST.

DAVIS R. DEWEY.
NATHANIEL I. BOWDITCH.
JOHN F. GANNON.

* ARTHUR W. GILBERT.

OFFICERS OF THE INSTITUTION.

As of Nov. 1, 1923.

OFFICERS OF GENERAL ADMINISTRATION.

KENYON L. BUTTERFIELD, A.M., LL.D.	President's House.
President of the College.	
HENRY S. GREEN, A.B., LL.D.	Mount Pleasant.
Librarian of the College.	
PHILIP B. HASBROUCK, B.Sc.	31 Fearing Street.
Registrar of the College.	
SIDNEY B. HASKELL, B.Sc.	2 Mount Pleasant.
Director of the Experiment Station.	
FRED C. KENNEY	Mount Pleasant.
Treasurer of the College.	
EDWARD M. LEWIS, A.M.	35 South Pleasant Street.
Dean of the College.	
CHARLES E. MARSHALL, Ph.D.	44 Sunset Avenue.
Director of the Graduate School.	
RICHARD A. MELLEN, B.Sc.	25 Fearing Street.
Field Agent.	
JOHN PHELAN, A.M.	Mount Pleasant.
Director of Short Courses.	
RALPH J. WATTS, B.Sc.	101 Butterfield Terrace.
Secretary of the College.	
JOHN D. WILLARD, B.A.	31 Lincoln Avenue.
Director of the Extension Service.	

THE FACULTY OF INSTRUCTION.

KENYON L. BUTTERFIELD, A.M., LL.D.	President's House.
President of the College and Head of the Division of Rural Social Science.	
MAX F. ABELL, B.Sc.	North Amherst.
Assistant Professor of Farm Management.	
GEORGE W. ALDERMAN, B.A.	North Pleasant Street.
Instructor in Physics.	
CHARLES P. ALEXANDER, Ph.D.	120 Pleasant Street.
Assistant Professor of Entomology.	
EDGAR L. ASHLEY, A.M.	Amherst House.
Professor of German.	
ROY C. AVERY, M.Sc.	15 Spring Street.
Instructor in Microbiology.	
LUTHER BANTA, B.Sc.	Sunset Avenue.
Assistant Professor of Poultry Husbandry.	
MARY A. BARTLEY	50 Pleasant Street.
Instructor in Home Economics.	
ARTHUR B. BEAUMONT, Ph.D.	51 Amity Street.
Professor of Agronomy and Head of Department.	
CARL M. BOGHOLT, B.Sc.	The Davenport.
Instructor in English.	
THOMAS BRADY, Jr., Captain, Cavalry, U. S. A.	Amherst House.
Assistant Professor of Military Science and Tactics.	
ALEXANDER E. CANCE, Ph.D.	9 Fearing Street.
Professor of Agricultural Economics and Head of Department.	
MORTON H. CASSIDY, B.Sc.	The Apiary.
Assistant Professor of Beekeeping.	

JOSEPH S. CHAMBERLAIN, Ph.D.	Mount Pleasant.
Professor of Organic and Agricultural Chemistry.	
WALTER W. CHENOWETH, M.Sc.	North Amherst.
Professor of Horticultural Manufactures and Head of Department.	
ORTON L. CLARK, B.Sc.	12 College Street.
Assistant Professor of Botany.	
G. CHESTER CRAMPTON, Ph.D.	Fernald Hall.
Professor of Insect Morphology.	
WILLIAM H. DAVIS, Ph.D.	8 Allen Street.
Assistant Professor of Botany.	
LLEWELLYN L. DERBY	25 Taylor Street, Holyoke.
Instructor in Physical Education.	
LAWRENCE S. DICKINSON, B.Sc.	2 Farview Way.
Assistant Professor of Horticulture.	
BROOKS D. DRAIN, B.Sc.	50 Pleasant Street.
Assistant Professor of Pomology.	
HENRY T. FERNALD, Ph.D.	44 Amity Street.
Professor of Entomology, Head of Department, Chairman of Division of Science.	
JAMES A. FOORD, M.Sc.Agr.	54 Lincoln Avenue.
Professor of Farm Management and Head of Department.	
PHILIP E. FOSS, B.Sc.	42 Lincoln Avenue.
Instructor in Zoölogy.	
ARTHUR P. FRENCH, M.Sc.	9 Phillips Street.
Instructor in Pomology.	
GEORGE E. GAGE, Ph.D.	The Davenport.
Professor of Animal Pathology and Head of Department of Veterinary Science and Animal Pathology.	
MARY E. M. GARVEY, B.Sc.	29 South Prospect Street.
Instructor in Microbiology.	
GUY V. GLATFELTER, M.Sc.	10 Kendrick Place.
Assistant Professor of Animal Husbandry.	
HARRY N. GLICK, A.M.	13 South Prospect Street.
Professor of Agricultural Education.	
HELENA T. GOESSMAN, M.Ph.	35 South Pleasant Street.
Instructor in English.	
CLARENCE E. GORDON, Ph.D.	38 Lincoln Avenue.
Professor of Zoölogy and Geology, and Head of Department.	
HOWARD R. GORDON, B.Sc.	The Apiary.
Instructor in Physical Education.	
HAROLD M. GORE, B.Sc.	70 Lincoln Avenue.
Assistant Professor of Physical Education.	
JOHN C. GRAHAM, B.Sc.Agr.	68 Lincoln Avenue.
Professor of Poultry Husbandry and Head of Department.	
EMORY E. GRAYSON, B.Sc.	Belchertown.
Instructor in Physical Education.	
LAURENCE R. GROSE, A.B., M.F.	45 Amity Street.
Professor of Forestry and Head of Department.	
CHRISTIAN I. GUNNESS, B.Sc.	105 Butterfield Terrace.
Professor of Rural Engineering and Head of Department.	
MARGARET HAMLIN, B.A.	12 North East Street.
Agricultural Counsellor for Women.	
ELMER A. HARRINGTON, Ph.D.	7 Allen Street.
Professor of Physics.	
ROY D. HARRIS, B.Sc.	12 Chestnut Street.
Assistant Professor of Vegetable Gardening.	
ARTHUR K. HARRISON	8 Allen Street.
Assistant Professor of Landscape Gardening.	
PHILIP B. HASBROUCK, B.Sc.	31 Fearing Street.
Professor of Physics and Head of Department.	
CURRY S. HICKS, B.Pd.	The Davenport.
Professor of Physical Education and Hygiene, and Head of Department.	
MRS. CURRY S. HICKS, ¹	The Davenport.
Instructor in Physical Education.	
DWIGHT HUGHES, Jr., Captain, Cavalry, U. S. A.	The Davenport.
Assistant Professor of Military Science and Tactics.	

ARAO ITANO, Ph.D.	13 Fearing Street.
Assistant Professor of Microbiology.	
HENRY F. JUDKINS, B.Sc.	103 Butterfield Terrace.
Professor of Dairying and Head of Department.	
ARTHUR N. JULIAN, A.B.	4 Farview Way.
Assistant Professor of Chemistry.	
HERMAN KOBBE, Major, Cavalry, U. S. A.	Snell Street.
Professor of Military Science and Tactics, and Head of Department.	
MARSHALL O. LANPHEAR, B.Sc.	4 Nutting Avenue.
Instructor in Agronomy.	
JOHN B. LENTZ, A.B., V.M.D.	3 Dana Street.
Assistant Professor of Veterinary Science and College Veterinarian.	
EDWARD M. LEWIS, A.M.	35 South Pleasant Street.
Professor of Languages and Literature, Head of Department and Head of Division of Humanities.	
JOSEPH B. LINDSEY, Ph.D.	47 Lincoln Avenue.
Goessman Professor of Agricultural Chemistry and Head of Department.	
WILLIAM L. MACHMER, A.M.	25 Amity Street.
Professor of Mathematics and Assistant Dean.	
ALEXANDER A. MACKIMMIE, A.M.	North Amherst.
Professor of French.	
CHARLES E. MARSHALL, Ph.D.	44 Sunset Avenue.
Professor of Microbiology and Head of Department.	
FREDERICK A. McLAUGHLIN, B.Sc.	4 Nutting Avenue.
Assistant Professor of Botany.	
CHARLES A. MICHELS, M.Sc.	12 Nutting Avenue.
Assistant Professor of Agronomy.	
FRANK C. MOORE, A.B.	10 Allen Street.
Assistant Professor of Mathematics.	
RICHARD T. MULLER, M.Sc.	45 East Pleasant Street.
Assistant Professor of Floriculture.	
JOHN B. NEWLON	North Amherst.
Instructor in Rural Engineering.	
JOSEPH F. NOVITSKI, B.Sc. ¹	1 Dana Street.
Instructor in Rural Sociology.	
A. VINCENT OSMUN, M.Sc.	16 Northampton Road.
Professor of Botany and Head of Department.	
JOHN E. OSTRANDER, A.M., C.E.	33 North Prospect Street.
Professor of Mathematics and Head of Department.	
CHARLES H. PATTERSON, A.M.	26 Lincoln Avenue.
Professor of English.	
HARLOW L. PENDLETON, B.Sc.	Fearing Street.
Instructor in Dairying.	
CHARLES A. PETERS, Ph.D.	Sunset Place.
Professor of Inorganic and Soil Chemistry.	
JOHN PHELAN, A.M.	3 Mount Pleasant.
Professor of Rural Sociology and Head of Department.	
WAYLAND R. PORTER, B.Sc.	Belchertown Road.
Instructor in Mathematics.	
WALTER E. PRINCE, A.M.	27 Amity Street.
Assistant Professor of English.	
MARION C. PULLEY, B.Sc.	1 Allen Street.
Instructor in Poultry Husbandry.	
GEORGE F. PUSHEE	North Amherst.
Instructor in Rural Engineering.	
GEORGE J. RALEIGH, B.Sc.	7 East Pleasant Street.
Instructor in Pomology.	
FRANK P. RAND, A.M.	North Amherst.
Assistant Professor of English.	
VICTOR A. RICE, M.Agr.	10 Woodside Avenue.
Assistant Professor of Animal Husbandry.	
WILLIAM F. ROBERTSON, B.Sc.	10 Nutting Avenue.
Instructor in Horticultural Manufactures.	
ROLAND W. ROGERS, B.Sc.	32 North Prospect Street.
Assistant Professor of Horticulture.	

¹ On leave of absence.

WILLIAM C. SANCTUARY, B.Sc.	23 Woodside Avenue.
Professor of Poultry Husbandry.	
DONALD W. SAWTELLE, M.Sc.	5 Allen Street.
Assistant Professor of Agricultural Economics.	
FRED C. SEARS, M.Sc.	Mount Pleasant.
Professor of Pomology and Head of Department.	
PAUL SEREX, Jr., Ph.D.	Lincoln Avenue.
Assistant Professor of Chemistry.	
JAMES V. V. SHUFELT, B.Sc., Captain, Cavalry, U. S. A.	8 Orchard Street.
Assistant Professor of Military Science and Tactics.	
NEWELL L. SIMS, Ph.D.	16 North Prospect Street.
Professor of Rural Sociology.	
EDNA L. SKINNER, B.Sc.	50 Lincoln Avenue.
Professor of Home Economics, Head of Department, Adviser of Women.	
HAROLD W. SMART, LL.B. ¹	Nash Block.
Instructor in Farm Law.	
RICHARD W. SMITH, Jr., B.Sc.	17 Fearing Street.
Instructor in Dairying.	
GRANT B. SNYDER, B.Sc.Agr.	17 Fearing Street.
Instructor in Vegetable Gardening.	
JAMES L. STRAHAN, M.Sc.	50 Amity Street.
Assistant Professor of Rural Engineering.	
CHARLES H. THAYER	South East Street.
Instructor in Agronomy.	
CLARK L. THAYER, B.Sc.	North Amherst.
Professor of Floriculture and Head of Department.	
WESTON C. THAYER, B.Sc.	14 Nutting Avenue.
Instructor in Animal Husbandry.	
GUY A. THELIN, B.Sc.	31 North Prospect Street.
Instructor in Agronomy.	
PAUL E. THISSELL, A.B.	81 Pleasant Street.
Instructor in French.	
CHARLES H. THOMPSON, M.Sc.	Mount Pleasant.
Professor of Horticulture.	
HAROLD F. TOMPSON, B.Sc.	Lexington.
Professor of Vegetable Gardening and Head of Department.	
RAY E. TORREY, Ph.D.	Inwood.
Assistant Professor of Botany.	
RALPH A. VAN METER, B.Sc.	7 East Pleasant Street.
Professor of Pomology.	
PAUL W. VIETS	5 Kendrick Place.
Supervisor of Placement Training.	
FRANK A. WAUGH, M.Sc.	Campus.
Professor of Landscape Gardening, Head of Department, Head of Division of Horticulture.	
WINTHROP S. WELLES, B.Sc.	23 Lincoln Avenue.
Professor of Agricultural Education and Head of Department.	
T. GEORGE YAXIS, M.Sc.	Sunset Avenue.
Assistant Professor of Dairying.	
HUBERT W. YOUNT, M.Sc.	9 Fearing Street.
Instructor in Agricultural Economics.	

Professor of Animal Husbandry and Head of Department.

Professor of Economics and Sociology and Head of Department.

THE EXPERIMENT STATION STAFF.

KENYON L. BUTTERFIELD, A.M., LL.D.	President's House.
President of the College.	
SIDNEY B. HASKELL, B.Sc.	2 Mount Pleasant.
Director.	
JAMES R. ALCOCK	North Amherst.
Laboratory Assistant in Animal Nutrition.	
HARRY L. ALLEN	89 Main Street.
Laboratory Assistant in Chemistry.	

¹ Temporary.

PAUL J. ANDERSON, Ph.D.	25 Lincoln Avenue.
Research Professor of Botany.	
JOHN G. ARCHIBALD, B.Sc.Agr.	North Amherst.
Assistant Research Professor of Chemistry.	
JOHN S. BAILEY, M.Sc.	50 Pleasant Street.
Investigator in Pomology.	
ALYN S. BALL	94 Main Street.
Laboratory Assistant in Botany.	
ARTHUR B. BEAUMONT, Ph.D.	51 Amity Street.
Professor of Agronomy and Head of Department.	
ARTHUR I. BOURNE, B.A.	12 East Pleasant Street.
Assistant Research Professor of Entomology.	
ALEXANDER E. CANCE, Ph.D.	9 Fearing Street.
Professor of Agricultural Economics and Head of Department.	
WALTER W. CHENOWETH, M.Sc.	North Amherst.
Professor of Horticultural Manufactures and Head of Department.	
ORTON L. CLARK, B.Sc.	12 College Street.
Assistant Professor of Botany.	
ROBERT L. COFFIN	12 Cottage Street.
Investigator in Agriculture.	
WILLIAM L. DORAN, B.Sc.	Lexington.
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Investigator in Chemistry.	
F. ETHEL FELTON, B.A.	The Davenport.
Editorial Assistant.	
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Research Professor in charge of Cranberry Station.	
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Assistant to the Director.	
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Professor of Poultry Husbandry and Head of Department.	
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Professor of Rural Engineering and Head of Department.	
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Assistant Research Professor of Agricultural Economics.	
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JOHN P. JONES, M.Sc.	Tillson Court.
Assistant Research Professor of Agronomy.	
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Professor of Dairying and Head of Department.	
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Assistant Research Professor of Veterinary Science.	
DONALD S. LACROIX, B.Sc.	East Wareham.
Investigator in Agriculture.	
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Vice-Director, Professor of Chemistry and Head of Department.	
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Professor of Microbiology and Head of Department.	
FRED W. MORSE, M.Sc.	40 Pleasant Street.
Research Professor of Chemistry.	
A. VINCENT OSMUN, M.Sc.	16 Northampton Road.
Professor of Botany and Head of Department.	

JOHN E. OSTRANDER, A.M., C.E.	33 North Prospect Street.
Meteorologist.	
NORMAN J. PYLE, V.M.D.	5 Dana Street.
Assistant Research Professor of Avian Pathology.	
RUBY SANBORN, A.B.	45 Pleasant Street.
Investigator in Poultry Husbandry.	
FRED C. SEARS, M.Sc.	Mount Pleasant.
Professor of Pomology and Head of Department.	
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HAROLD F. THOMPSON, B.Sc.	Lexington.
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Curator, Department of Botany.	
HAROLD E. WILSON	15 Phillips Street.
Laboratory Assistant in Pomology.	
FRANK A. WAUGH, M.Sc.	Campus.
Head of Division of Horticulture.	
HARLAN N. WORTHLEY, M.Sc.	Tillson Court.
Investigator in Entomology.	

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OLIVER S. FLINT, B.Sc.	18 Nutting Avenue.
Analyst.	
HENRI D. HASKINS, B.Sc.	Easthampton.
Official Chemist, Fertilizer Control.	
JAMES T. HOWARD	7 Phillips Street.
Inspector.	
FRANK J. KOKOSKI, B.Sc.	Northampton Road.
Analyst.	
HAZEL M. PARKER	North Amherst.
Analyst.	
JOHN J. SMITH	9 Phillips Street.
Collector of Blood Samples.	
PHILIP H. SMITH, M.Sc.	102 Main Street.
Official Chemist, Feed Control.	
LEWELL S. WALKER, B.Sc.	19 Phillips Street.
Assistant Official Chemist, Fertilizer Control.	

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JOHN B. ABBOTT, M.Sc.	31 North Prospect Street.
Extension Professor of Agronomy.	
FREDERICK F. COLE, Jr., B.Sc.	8 Kellogg Avenue.
Assistant Extension Professor of Pomology.	
WILLIAM R. COLE	5 East Pleasant Street.
Assistant Extension Professor of Horticultural Manufactures.	
GEORGE L. FARLEY, M.Sc.	61 Amity Street.
State Club Leader.	
CLIFFORD J. FAWCETT, B.Sc.	7 Woodside Avenue.
Extension Professor of Animal Husbandry.	
ROBERT D. HAWLEY, B.Sc.	South Amherst.
Supervisor of Extension Schools and Exhibits.	
WILLIAM F. HOWE	North Amherst.
Assistant State Club Leader.	
WILLIAM P. B. LOCKWOOD, M.Sc.	West Newton.
Extension Professor of Dairying.	

ROBERT J. McFALL, Ph.D.	20 Spring Street.
Extension Professor of Agricultural Economics.	
WILLIAM C. MONAHAN, B.Sc.	8 Kellogg Avenue.
Extension Professor of Poultry Husbandry.	
DOROTHY W. MURDOCK	87 Pleasant Street.
Assistant State Club Leader.	
EARLE H. NODINE, B.Sc.	21 Pleasant Street.
Extension Instructor in charge of Poultry Club Work.	
SUMNER R. PARKER, B.Sc.	South Amherst.
Supervisor of County Agent Projects.	
RALPH W. REDMAN, B.Sc.	3 Hallock Street.
Assistant Director.	
LUCILLE W. REYNOLDS, B.Sc.	9 Phillips Street.
State Leader of Home Demonstration Agents.	
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Assistant Extension Professor of Home Economics.	
JOSEPH F. WHITNEY, B.Sc., M.L.A.	83 Pleasant Street.
Assistant Extension Professor of Landscape Gardening.	
Extension Professor of Farm Management.	
Extension Editor and Supervisor of Correspondence Courses.	
Assistant Extension Professor of Home Economics.	

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Library Assistant.	
LENA V. CHAPMAN	77 South Pleasant Street.
Assistant in charge of circulation.	
KATHARINE POWELL	9 Amity Street.
Department Librarian.	
BESSIE M. WEYMOUTH	87 Pleasant Street.
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AVIS P. CHRISTOPHER	Infirmary.
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LULU DIETHER	Draper Hall.
Manager of the Dining Hall.	
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JOHN J. LEE	38 Cottage Street.
Assistant to the Military Detail.	
MRS. MARIE B. MARSH	Abigail Adams House.
Matron.	
WILLIAM E. MARTIN	5 Phillips Street.
Laboratory Assistant, Department of Horticultural Manufactures.	
ENOS J. MONTAGUE, B.Sc.	Campus.
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ADELBERT SHEFFIELD	North Amherst.
Superintendent of Dairy Manufactures.	
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Supervisor of Agricultural Projects.	
HAROLD S. WILLIAMSON, B.Sc.Agr.	8 Kellogg Avenue.
Supervisor of Agricultural Projects.	

GRADUATE ASSISTANTS.

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Department of Poultry Husbandry.	
ELEANOR F. CHASE, B.Sc.	Abigail Adams House.
Department of Chemistry.	
OTTO DEGENER, B.Sc.	Clark Hall.
Department of Botany.	
JAMES GIBBARD, Jr., B.S.A.	Tillson Court.
Department of Microbiology.	
GERALD M. GILLIGAN, B.Sc.	One Acre.
Department of Chemistry.	
JULIA P. HODGON, B.A.	The Davenport.
Department of Microbiology.	
WALDEMAR C. JOHNSON, B.Sc.	16 Nutting Avenue.
Department of Landscape Gardening.	
WILLARD P. JONES, B.Sc.	5 Sunset Avenue.
Department of Agronomy.	
HENRY LOUWSMA, A.B.	69 Lincoln Avenue.
Department of Chemistry.	
MERRILL J. MACK, B.Sc.	84 Pleasant Street.
Department of Agriculture.	
RAYMOND A. MOONEY, B.Sc.	North Amherst.
Department of Agronomy.	
J. RAYMOND SANBORN, B.Sc.	North Amherst.
Department of Microbiology.	
KENNETH B. SIMMONS, B.Sc.	16 Nutting Avenue.
Department of Landscape Gardening.	
PAUL L. STEERE, B.Sc.	9 Fearing Street.
Department of Agricultural Economics.	
HARRISON M. TIETZ, M.Sc.	84 Pleasant Street.
Department of Entomology.	

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1923-24.

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 Treasurer KENNEY.
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President BUTTERFIELD.
 Dean LEWIS.
 Professor WAUGH.
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 Professor MARSHALL.
 Professor CHAMBERLAIN.
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Dean LEWIS.
 Professor MACHMER.
 Professor PHELAN.
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Professor HASBROUCK.
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ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence concerning admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of character, which, whenever possible, should come from the principal of the school at which the applicant has prepared for college. Candidates who desire to present themselves for examination in any subjects must make application to the college for such privilege at least one month before the date of the examination. Blanks for such application may be obtained by addressing the registrar of the college. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon certificate or upon examination. No *diploma* from a secondary school will be accepted.

CERTIFICATES. — The Massachusetts Agricultural College is affiliated with the New England College Entrance Certificate Board. Therefore certificates of admission will be accepted from schools approved by the Board. Certificates of admission will also be accepted from any Massachusetts school listed as class "A" by the State Department of Education, but not included in the approved lists of the New England College Entrance Certificate Board. Principals of schools in New England who desire the certificate privilege should address the secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn. Certificates from schools outside of New England may be received if those schools are on the approved list of the leading colleges of the section in which the school in question is located.

The credentials of the Board of Regents of the State of New York are accepted as satisfying the entrance requirements of this college when offered subject for subject.

Certificates in order to be accepted must present in the prescribed and restrictive elective groups at least three of the necessary fourteen and one-half credits. It is to be understood, however, that responsibility for certification in either elementary French, elementary German, English 1 or English 2, Latin A, Greek A or algebra must be assumed by one school, if the candidate has received his preparation in any one subject named above in more than one school. Subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. Conditions to the amount of two units will be allowed.

Entrance examination for admission to the Massachusetts Agricultural College will be held at the following centers: —

In June Amherst, Department of Physics building.
Massachusetts Institute of Technology,
Cambridge, Mass.
Worcester, Horticultural Hall.

In September Amherst, Department of Physics building.

Please note that September examinations are held in Amherst only.

Schedule for Entrance Examinations, June 19-21, inclusive, 1924. — The examinations in June will follow this schedule: —

First Day.

7.45 A.M. Registration.¹
8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Second Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

Third Day.

8.00 A.M. French, German, Spanish, required and elective.
1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

Schedule for Entrance Examinations in September. — In September, 1924, the examinations will be given September 17-20, inclusive, and will follow the order indicated below: —

First Day.

1.00 P.M. Registration.¹
1.15-5.00 P.M. Greek, elementary and intermediate.

Second Day.

8.00 A.M. Plane geometry.
10.00 A.M. Chemistry.
11.30 A.M. Botany.
2.00 P.M. Solid geometry.
4.00 P.M. Physics.

Third Day.

8.00 A.M. English 1 and 2.
11.00 A.M. Algebra.
2.00 P.M. History (ancient; medieval and modern; English; general; United States and civics).

Fourth Day.

8.00 A.M. French, German, Spanish, required and elective.
1.00 P.M. Latin, elementary, intermediate and advanced, and all one-half credit electives, except those already noted.

C. REQUIREMENTS FOR ADMISSION.

The requirements for admission are based on the completion of a four-year high school course, or its equivalent, and are stated in terms of units. The term unit means the equivalent of at least four recitations a week for a school year.

Fourteen and one-half units must be offered for admission in accordance with the

¹ Candidates who have no examination at the time set for registration may register at the time of the first examination should they so desire.

entrance requirements as stated below. Entrance credits gained either by certificate or by examination will hold good for one year.

Entrance Requirements.

1. *Prescribed.* — The following units are prescribed: —

English 1	1½
English 2	1½
A foreign language	2
Algebra	1½
Plane geometry	1
	7½

2. *Restricted Electives.* — Three units to be selected from —

Science	1, 2 or 3
History (American history and civics included)	1, 2 or 3
A second foreign language	2 or 3
Additional work, in first foreign language	1 or 2

3. *Free Margin.* — Free margin of four units to consist of any substantial work (including agriculture, general science and a fourth year of English) for which credit of not less than one-half unit earned in one year is given toward a secondary school diploma.

Units presented in the free margin group are not to be offered by examination or by certificate, but presented by submitting a principal's statement to the effect that such units have been earned in a secondary school, and have been credited toward a diploma issued by such a school. Work offered in the free margin group must be completed with certificate grade.

4. One unit of history must be offered in either the restricted electives or the free margin.

5. If elementary algebra and plane geometry are counted as three units, the total requirement will be fifteen units.

6. Both the credits under the prescribed group and the restricted elective group must be presented either by certificate from an approved school or by examination, or by a combination of both.

The following is a list of subjects in which the entrance credits must be offered in the prescribed and restricted elective groups: —

Mathematics and Science.

Botany ¹	½ or 1
Chemistry ¹	1
Algebra	1½
Plane geometry	1
Solid geometry	½
Trigonometry	½
Physics ¹	1
Geology	½
Physical geography	½
Physiology	½
Zoölogy ¹	½

History.

Ancient	1
Medieval and modern	1
English	1
General	1
United States and civics	1

¹ Note-book required as part of the preparation will be credited as part of the examination.

<i>English.</i>									
English 1	.	.	.	.	.	.	.	.	1½
English 2	.	.	.	.	.	.	.	.	1½

<i>Foreign Language.</i>									
Elementary French	.	.	.	.	.	.	.	.	2
Elementary German	.	.	.	.	.	.	.	.	2
Elementary Spanish	.	.	.	.	.	.	.	.	2
Elementary Latin	.	.	.	.	.	.	.	.	2
Elementary Greek ¹	.	.	.	.	.	.	.	.	2
Intermediate French	.	.	.	.	.	.	.	.	1
Intermediate German	.	.	.	.	.	.	.	.	1
Intermediate Spanish	.	.	.	.	.	.	.	.	1
Intermediate Latin	.	.	.	.	.	.	.	.	1
Intermediate Greek ¹	.	.	.	.	.	.	.	.	1
Advanced French	.	.	.	.	.	.	.	.	1
Advanced German	.	.	.	.	.	.	.	.	1
Advanced Spanish	.	.	.	.	.	.	.	.	1
Advanced Latin	.	.	.	.	.	.	.	.	1

No applicant deficient in both algebra and plane geometry will be admitted.

PRESENTATION OF NOTE-BOOKS. — The keeping of a note-book is required as part of the preparation in those subjects indicated (see note 1, below).

Candidates presenting themselves for examination in such subjects must present at the same time the required note-book, properly certified by the principal. Candidates presenting such subjects on certificates should not present note-books, but their certificates must state that note-books have been satisfactorily completed.

D. STATEMENT OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Entrance credit in agriculture is granted on the following basis: —

I. The Massachusetts Agricultural College accepts a maximum of four credits in agriculture from any secondary or county agricultural high school in Massachusetts offering work in that subject, provided evidence of such work having been done is submitted on a principal's statement, as is indicated in the "free margin" group.

II. In high schools organizing agricultural club work under the supervision and rules of the junior extension service of the college, one credit is granted for each full year of work performed under the following plan: —

Work of the Winter Term. — (a) The study of textbooks such as are suitable for secondary school instruction in agriculture.

(b) Course of Study: A general outline of suggested topics for study.

(c) Visits by a representative of the Massachusetts Agricultural College for observation, counsel and advice in regard to kind and amount of work being done in agriculture.

(d) Formation of an agricultural club with officers from among its own members, meeting once a month under local supervision of some one authorized to act for the school authorities.

Work of the Spring Term. — Same in general form as winter term.

Work of the Summer Term. — An approved project conforming to the rules of some one or more of the agricultural clubs of the junior extension service of the Massachusetts Agricultural College.

Work of the Fall Term. — (a) An exhibit of work.

(b) Reports and story of achievement submitted to the junior extension service of the college.

The maximum number of credits in agriculture is four.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board, or its equivalent,

¹ Examination in September only.

will be accepted. This work should occupy one school year and include laboratory and supplementary textbook study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. These requirements are met by such texts as Stevens' "Introduction to Botany" and Bergin & Davis' "Principles of Botany." A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half-unit or the one-unit credit, and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

CHEMISTRY. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from any standard textbook, with laboratory work on the properties of the common elements and their simpler compounds. No particular work is prescribed. The keeping of a note-book is required.

Students who do not take chemistry in the preparatory school begin the subject in college, and are required to do extra work during the first two terms, as outlined under chemistry, courses 1 and 2, page 74.

MATHEMATICS. — (a) Required. — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good textbooks, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(b) *Elective.* — Solid Geometry: The usual theorems and constructions of good textbooks, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work must consist of both classroom work and laboratory practice. The work covered in the class-room should be equal to that outlined in Hall & Bergen's "Textbook of Physics" or Millikan & Gale; the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be

given on laboratory notes and on the examination submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOLOGY. — Hough & Sedgwick's "The Human Mechanism;" Martin's "The Human Body; Briefer Course."

ZOOLOGY, PHYSICAL GEOGRAPHY, GEOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above:—

For physiography, Davis' "Elementary Physical Geography;" Gilbert & Brigham's "Introduction to Physical Geography." For zoölogy, textbooks entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Textbook in General Zoölogy." For geology, A. P. Brigham's "A Textbook of Geology" or Tarr's "Elementary Geology."

Applicants for examination in zoölogy are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present note-books, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

HISTORY. — The required unit must be offered in either ancient history, medieval and modern history, English history, general history, or United States history and civics. Either one, two or three elective units in any of the historical subjects here named may be offered, provided that no unit be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board. The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good textbooks, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on outline maps.

To indicate in a general way the character of the text-book work expected, the texts of the following authors are suggested: Botsford, Morey or Myers, in ancient history (to 814 A.D.); Adams, West or Myers, in medieval history; Montgomery, Larned or Cheyney, in English history; Myers or Fisher, in general history; Fiske, together with MacLaughlin or Montgomery, in United States history and civics.

ENGLISH. — The study of English in school has two main objects, which should be considered of equal importance: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation, and the development of the habit of reading good literature with enjoyment.

(1) *Grammar and Composition* (One and One-half Units). — The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

(2) *Literature* (One and One-half Units). — The second object is sought by means of two lists of books, headed, respectively, "Reading" and "Study," from which may be framed a progressive course in literature covering four years. In connection with both lists the student should be trained in reading aloud and encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

A. *Books for Reading*. — The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

The books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except that for any book in Group I a book from any other may be substituted.

GROUP I. CLASSICS IN TRANSLATION.

The "Old Testament," at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings and Daniel, together with the books of Ruth and Esther.

The "Odyssey," with the omission, if desired, of Books I-V, XV and XVI.

The "Æneid."

The "Odyssey" and the "Æneid" should be read in English translations of recognized literary excellence.

GROUP II. DRAMA.

Shakespeare: "Merchant of Venice," "As You Like It," "Julius Cæsar."

GROUP III. PROSE FICTION.

Dickens: "A Tale of Two Cities."

George Eliot: "Silas Marner."

Scott: "Quentin Durward."

Hawthorne: "The House of the Seven Gables."

GROUP IV. ESSAYS, BIOGRAPHY, ETC.

Addison and Steele: "The Sir Roger de Coverley Papers."

Irving: "The Sketch Book," selections covering about 175 pages.

Macaulay: "Lord Clive."

Parkman: "The Oregon Trail."

GROUP V. POETRY.

Tennyson: "The Coming of Arthur," "Gareth and Lynette," "Lancelot and Elaine," "The Passing of Arthur."

Browning: "Cavalier Tunes," "The Lost Leader," "How They Brought the Good News from Ghent to Aix," "Home Thoughts from Abroad," "Home Thoughts from the Sea," "Incident of the French Camp," "Herve Riel," "Pheidippides," "My Last Duchess," "Up at a Villa — Down in the City," "The Italian in England," "The Patriot," "The Pied Piper," "De Gustibus," "Instans Tyrannus."

Scott: "The Lady of the Lake."

Coleridge: "The Ancient Mariner."

Arnold: "Sohrab and Rustum."

B. *Books for Study*. — This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions.

The books provided for study are arranged in four groups, from each of which one selection is to be made.

GROUP I. DRAMA.

Shakespeare: "Macbeth," "Hamlet."

GROUP II. POETRY.

Milton: "L'Allegro," "Il Penseroso," "Comus."

Book IV of Palgrave's "Golden Treasury" (first series), with special attention to Wordsworth, Keats and Shelley.

GROUP III. ORATORY.

Burke: "Speech on Conciliation with America."

Washington's "Farewell Address," Webster's "First Bunker Hill Oration," and Lincoln's "Gettysburg Address."

GROUP IV. ESSAYS.

Macaulay: "Life of Johnson."

Carlyle: "Essay on Burns," with a brief selection from Burns' poems.

Examination. — However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies and from his personal knowledge and experience quite apart from reading.

The examination in literature will include: —

(a) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under "A, Reading," above.

(b) A test on the books prescribed for study, which will consist of questions upon their content and structure, and upon the meaning of such words, phrases and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their works and the periods of literary history to which they belong.

FRENCH. — Elementary: The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year French (elective subjects for admission). — For a third credit unit in French as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in French will be given unless the candidate has presented elementary French on certificate, or has written the examination in elementary French.

No examination for a fourth credit in French will be given unless the candidate has presented both elementary and intermediate French upon certificate, or has written the examination in both elementary and intermediate French.

GERMAN. — Elementary: The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-year requirements).

Third and fourth year German (elective subjects for admission). — For a third credit unit in German as an elective subject for entrance, when required units have been offered in German, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in German will be given unless the candidate has presented elementary German upon certificate, or has written the examination in elementary German.

No examination for a fourth credit in German will be given unless the candidate has presented both elementary and intermediate German upon certificate, or has written the examination for both elementary and intermediate German.

SPANISH. — *Elementary:* The necessary preparation for this examination is stated in the description of the two-year course in elementary Spanish recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board.

Third and fourth year Spanish (elective subjects for admission). — For a third credit unit in Spanish as an elective subject for entrance, the work heretofore described by the College Entrance Examination Board as "intermediate" is expected. For a fourth credit unit, the work described as "advanced" is expected.

No examination for a third unit in Spanish will be given unless the candidate has presented elementary Spanish on certificate, or has written the examination in elementary Spanish.

No examination for a fourth credit in Spanish will be given unless the candidate has presented both elementary and intermediate Spanish upon certificate, or has written the examination in both elementary and intermediate Spanish.

GREEK. — *Elementary.* — Greek grammar and composition: Translation into Greek of short sentences illustrating common principles of syntax.

The examination in grammar and prose composition will be based on the first four books of Xenophon's "Anabasis."

Intermediate. — Homer's "Iliad," Books I and II (omitting Book II, 494 to end), and the Homeric forms, constructions, idioms and prosody.

Prose composition, consisting of continuous prose based on Xenophon, and other Attic prose of similar difficulty.

Translation of passages of Homer at sight.

The examinations in Greek, elementary and intermediate, will be given in September only.

LATIN. — *Elementary.* — Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (a) the translation of a passage or passages taken from Cæsar's "Gallic War," covering at least four books, and (b) the translation of passages of Latin prose at sight.

Intermediate. — Cicero (third oration "Against Catiline" and the orations "For Archias" and "For Marcellus") and sight translation of prose.

Advanced. — Vergil (Æneid, II, III and VI) and sight translation of poetry.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.

2. A statement or certificate of his entrance record.
3. A statement from the proper officer showing a complete record of his work while in attendance.
4. A marked catalogue showing the courses pursued.
5. A statement from the proper officer, giving the total number of credits required for graduation by the institution from which the applicant is transferring, and, of this total, the number that the applicant has satisfactorily completed at the time of transfer.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. OTHER INFORMATION ABOUT ENTRANCE.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. To matriculate, candidates must offer twelve and one-half of the fourteen and one-half units required for admission, and will be conditioned in those subjects not passed. At least five and one-half credits must be in the prescribed group. No candidate deficient in both algebra and plane geometry will be admitted.

4. Examinations for the removal of entrance conditions will be held as follows: (1) First entrance condition examination during the first week of the second term. (2) Second entrance condition examination before the beginning of the period of final examinations of the second term, upon the payment of a fee of \$5 to the treasurer.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Examinations in part of the subjects required for entrance may be taken one year before entering college.

7. For information concerning expenses, scholarships, etc., see "General Information."

8. For information concerning admission to short courses, see "Short Courses."

9. Application for admission as a "Special Student" should be made to the Dean.

COURSES OF INSTRUCTION.

FRESHMAN YEAR.

TABLE OF FRESHMAN SUBJECTS.

[The figures indicate the number of credit hours per week. Freshman credit is computed on the basis of total clock hours per week spent in class room and study. Groups A and B of each term are required of all Freshman men; groups A and C of all Freshman women; total required credit, 50. For details, see the following tables of the first, second, and third terms, and the description of the courses.]

First Term.

COURSE AND NUMBER.	Class Hours.	Laboratory Hours.	Study Hours.	Credit in Clock Hours per Week.
<i>Required Groups.</i>				
Group A; for men and women:				
Agriculture 1	1	2	2	5
Chemistry 1.	3	4	5	12
or				
Chemistry 4	2	4	4	10
English 1	3	—	5	8
Language 1 or 4 (French or German)	3	—	6	9
Mathematics 1 (Algebra)	4	—	6	10
Group B; for men:				
Military 1 (or Physical Education 7)	—	3	—	3
Activities (including Physical Education 1 and 2) ¹	—	—	—	5 or 3
Group C; for women:				
Rural Home Life 1	2	—	—	2
Activities (including Physical Education 4) ¹	—	—	—	6 or 4
Total required credits, 50.				

¹ To be chosen from the groups of athletic and academic activities, including football, baseball, cross country, track, tennis, hiking, Glee Club chorus, orchestra, Collegian and Squib competition, and class debate.

Second Term.

COURSE AND NUMBER.	Class Hours.	Laboratory Hours.	Study Hours.	Credit in Clock Hours per Week.
<i>Required Groups.</i>				
Group A; for men and women:				
Agriculture 2	1	2	2	5
Chemistry 2	3	4	5	12
or				
Chemistry 5	2	4	3	9
English 2	3	—	5	8
Language 2 or 5 (French or German)	3	—	5	8
Mathematics 2 (Higher Algebra)	3	—	4	7
or				
Mathematics 3 (Solid Geometry)	3	—	4	7
Mathematics 4 (Mensuration)	2	—	3	5
Group B; for men:				
Military 2 (or Physical Education 8)	—	3	—	3
Activities ¹	—	—	—	5 or 2
Group C; for women:				
Activities (including Physical Education 5) ¹	—	—	—	8 or 5
Total required credits, 50.				

¹ To be chosen from the groups of athletic and academic activities, including basket ball, hockey, board track, boxing, wrestling, winter sports, skating, theory, Glee Club chorus, Glee Club, orchestra, club specials, dramatics, class debate, varsity debate, Collegian, Squib.

Third Term.

COURSE AND NUMBER.	Class Hours.	Laboratory Hours.	Study Hours.	Credit in Clock Hours per Week.
<i>Required Groups.</i>				
Group A; for men and women:				
Agriculture 3	1	2	2	5
Botany 3	2	4	4	10
English 3	3	—	6	9
Language 3 or 6 (French or German)	3	—	6	9
Mathematics 5 (Trig.)	3	—	6	9
Group B; for men:				
Military 3 (or Physical Education 9)	—	3	—	3
Activities (including Physical Education 3) ¹	—	—	—	5
Group C; for women:				
Activities (including Physical Education 6) ¹	—	—	—	8
Total required credits, 50.				

¹ To be chosen from the groups of athletic and academic activities, including baseball, track, football, tennis, hiking, theory, orchestra, dramatics, Burnham, Flint, Collegian, Squib.

SOPHOMORE YEAR.

TABLE OF SOPHOMORE SUBJECTS.

[The figures indicate the number of credit hours per week. Sophomore credit is computed on the basis of total clock hours per week spent in class room and study. Groups A and B of each term are required of all Sophomore men; groups A and C, of all Sophomore women. In addition, one of the "Divisional Elective Groups" is to be elected as a unit by each Sophomore; total required credit, 50. For details, see the following tables of the first, second, and third terms, and the description of the courses.]

First Term.

COURSE AND NUMBER.	Class Hours.	Laboratory Hours.	Study Hours.	Credit in Clock Hours per Week.
<i>Required Groups.</i>				
Group A; for men and women:				
Botany 25	1	4	2	7
English 25	2	—	4	6
English 28	1	—	2	3
Physics 25	3	2	4	9
Group B; for men:				
Military 25 (or Physical Education 30)	—	3	—	3
Activities (including Physical Education 25) ¹	—	—	—	5
Group C; for women:				
Rural Home Life 25	1	2	—	3
Activities (including Physical Education 27) ¹	—	—	—	5
<i>Divisional Elective Groups.</i>				
Agriculture:				
Animal Husbandry 25	1	4	3	8
Agronomy 25	3	4	2	9
Horticulture:				
Horticulture 25	1	4	4	9
Drawing 25	—	8	—	8
Science:				
Modern Language (French or German)	3	—	5	8
Chemistry 25	1	4	4	9
Rural Social Science:				
American Government 25	3	—	5	8
Economics 25	3	—	6	9
Total required credits, 50.				

¹ To be chosen from the groups of athletic and academic activities, including football, baseball, tennis, cross country, track, hiking, out-door basket ball, theory, Glee Club chorus, orchestra, Collegian, Squib, and Index competition, Collegian, and Squib.

Second Term.

The following table indicates the general plan of the Sophomore curriculum for the second term. The descriptions of second-term Sophomore courses in the body of the catalog have been left as for the year 1922-23, pending revision. Definite details of courses and credit will be announced before the beginning of the new term.

COURSE AND NUMBER.	Class Hours.	Laboratory Hours.	Study Hours.	Credit in Clock Hours per Week.
<i>Required Groups.</i>				
Group A; for men and women:				
English				
Zoology				
Group B; for men:				
Military (or Physical Education)				
Activities				
Group C; for women:				
Agricultural Education				
Activities (including Physical Education)				
<i>Divisional Elective Groups.</i>				
Agriculture:				
Animal Husbandry				
Chemistry				
Physics				
Horticulture:				
Horticulture				
Drawing				
Agriculture Economics				
Science:				
Modern Language (French or German)				
Physics				
Chemistry				
Rural Social Science:				
Agricultural Economics				
American Education				
Animal Husbandry				
Landscape Gardening:				
Horticulture				
Mathematics				
Drawing				
Total required credits,				

Third Term.

The following table indicates the general plan of the Sophomore curriculum for the third term. The descriptions of third-term Sophomore courses in the body of the catalog have been left as for the year 1922-23, pending revision. Definite details of courses and credit will be announced before the beginning of the new term.

COURSE AND NUMBER.	Class Hours.	Laboratory Hours.	Study Hours.	Credit in Clock Hours per Week.
<i>Required Groups.</i>				
Group A; for men and women:				
English				
Citizenship				
Group B; for men:				
Military (or Physical Education)				
Activities (including Physical Education)				
Group C; for women:				
Rural Home Life				
Activities (including Physical Education)				
<i>Divisional Elective Groups.</i>				
Agriculture:				
Animal Husbandry				
Agronomy				
Rural Engineering				
Horticulture:				
Horticulture				
Agronomy				
Physics				
Science:				
Modern Language (French or German)				
Physics				
Entomology				
Rural Social Science:				
Rural Sociology				
Agronomy				
Entomology				
Landscape Gardening:				
Horticulture				
Mathematics				
Drawing				
Total required credits,				

MAJORS: JUNIOR AND SENIOR YEARS.

GENERAL STATEMENT.

A major consists of 45 credit hours of correlated work, which is arranged by the student and his adviser.

The list of courses found under each major on subsequent pages should not be considered as necessarily a rigid program to be followed. The heads of departments have suggested this series of courses as the best for the average man majoring in their departments. Advisers may, however, make modifications to suit the particular needs of the student, provided these modifications conform precisely to the class schedule as published for the year.

RULES GOVERNING MAJORS.

RULE 1. *Election*. — Each student, before the first term of his junior year, shall elect a major subject from the list of majors given below; and this major shall consist of 45 credit hours of correlated work.

RULE 2. *Minimum Credits*. — The minimum number of credits for graduation shall be 237 credit hours, inclusive of military drill and physical education.

RULE 3. *Maximum Credits*. — The maximum number of credits for any term of the junior or senior year shall be 22; the minimum shall be 19.

RULE 4. *Humanities and Rural Social Science*. — A minimum of 18 credit hours in the Divisions of the Humanities and Rural Social Science will be required of all students during their junior and senior years, with the following restriction: that a minimum of 5 credit hours will be required in each of the divisions.

RULE 5. *Advisers*. — The work of each junior and senior will be under the immediate supervision of an instructor designated as major adviser. Ordinarily, the major adviser will be the head of the department in which the student elects his major. The adviser has full authority to prescribe the student's work up to 45 hours. He will, however, so far as practicable, recognize the individual needs of the student. It is also expected that students will seek the counsel of the adviser with respect to the remaining courses required for graduation.

RULE 6. *Free Electives*. — Each student during his junior and senior years is required to take 45 hours in his major and also 18 hours in the Divisions of the Humanities and Rural Social Science, making a total of 63 hours (but see Rule 4). He is allowed free choice of courses to complete his required hours.

RULE 7. *Registration*. — No junior or senior shall register until his major course of study is approved by his adviser.

(1) Course cards for recording the election of majors will be issued from the Schedule Room five weeks before the close of each term.

(2) This card must be submitted by each student to his major adviser, who will lay out the course for the succeeding term and countersign the card.

(3) Each course card must be filled out, giving the name of student, his major, his class and the name and address of parent or guardian. When the major courses have been entered on this card, and the hours of free elections added by the student, the card, accompanied by one hour plan, must be returned to the Schedule Room two weeks before the beginning of the final examination period.

RULE 8. *Change of Major*. — Applications for change of major may be made to the dean in writing at any time; when approved by both major advisers concerned and by the dean and the committee on scholarship, they become operative at the beginning of the term following, provided that no change in the selection of a major may be made by any student after registration day of his senior year.

DAIRYING. (Major.)
Professor HENRY F. JUDKINS, *Adviser.*
[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.		Senior.	Credit.
Agricultural Economics	53 III.	5	I.	Animal Husbandry 25	8	Dairying 50	5	Chemistry 76	5
Animal Husbandry	50 I.	3		Agronomy 25	9	Microbiology 50	5	Dairying 78	2
Animal Husbandry	81 II.	1				Animal Husbandry 50	3	Microbiology 82	5
Animal Husbandry	82 III.	1							
Chemistry	76 I.	5	II.	To be announced.		Dairying 52	2	Animal Husbandry 81	1
Dairying	50 I.	5				Microbiology 51	5	Dairying 75	5
Dairying	52 II.	2						Farm Management 75	3
Dairying	51 III.	5							
Dairying	75 II.	5	III.	To be announced.		Chemistry 30	5	Agricultural Economics 53	5
Dairying	76 III.	5				Dairying 51	5	Animal Husbandry 82	1
Dairying	78 I.	2				Rural Engineering 52	5	Dairying 76	5
Dairying	75 I.	3							
Farm Management	75 I.	3							
Microbiology	50 I.	5							
Microbiology	51 II.	5							
Microbiology	82 I.	5							
Rural Engineering	52 III.	5							
		62							

FARM MANAGEMENT. (Major.)

Professor JAMES A. FOORD, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy	50 I.	5	I.	Animal Husbandry 25	8	Agronomy 50	5	Rural Engineering 75	4
Animal Husbandry	50 I.	3		Agronomy 25	9	Dairying 50 (or 77 III)	5	Farm Management 76	3
Animal Husbandry	51 II.	3				Animal Husbandry 50	3		
Animal Husbandry	53 III.	3							
Dairying	50 I.		II.	To be announced.		Animal Husbandry 51	3	Farm Management 75	3
or						Microbiology 50	5	Farm Management 78	1
Dairying	77 III.	5						Rural Engineering 78	5
Farm Management	75 II.	3	III.						
Farm Management	76 I.	3				Microbiology 50	5	Farm Management 77	3
Farm Management	77 III.	1		To be announced.		Animal Husbandry 53	3	Farm Management 79	1
Farm Management	78 II.	1				Dairying 77	5	Farm Management 81	2
Farm Management	79 III.	1							
Microbiology	50 II.								
or									
Microbiology	50 III.	5							
Rural Engineering	75 I.	4							
Rural Engineering	78 III.	5							
		44							

ADDITIONAL INFORMATION. — Botany 26, Drawing 26, Entomology 26 and 27, Dairying 51, Forestry 58, Pomology 50, 51, 76 and 78, Rural Engineering 79, and Veterinary 75, 76 and 78 are suggested as additional courses for the student fitting himself for general agriculture.

POULTRY HUSBANDRY. (Major.)
Professor JOHN C. GRAHAM, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.		Junior.		Senior.	Credit.
					Credit.		Credit.		
Agricultural Economics	53 III.	5	I.	Animal Husbandry 25	8	Agronomy 50	5	Poultry 75	3
Agronomy	50 I.	5		Agromony 25	9	Animal Husbandry 50	3	Poultry 76	4
Animal Husbandry	50 I.	3				Poultry 50	5	Veterinary 85	3
Farm Management	75 II.	3							
Poultry Husbandry	50 I.	5	II.	To be announced.		Poultry 51	5	Farm Management 75	3
Poultry Husbandry	51 II.	5						Poultry 77	5
Poultry Husbandry	52 III.	3						Veterinary 86	3
Poultry Husbandry	75 I.	3							
Poultry Husbandry	76 I.	4	III.	To be announced.		Agricultural Economics 53	5	Poultry 79	4
Poultry Husbandry	77 II.	5				Poultry 52	5	Veterinary 87	3
Poultry Husbandry	79 III.	4							
Poultry Husbandry	85 I.	3							
Veterinary Science	86 II.	3							
Veterinary Science	87 III.	3							
		56							

STRONGLY ADVISED. — Microbiology 50 I, Rural Engineering 52 III, Zoölogy 76 II.

FLORICULTURE.

Professor CLARK L. THAYER, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany	50 I.	2	I.	Drawing 25 Horticulture 25	. . . 8 . . . 9	Floriculture 50	. . . 4	Floriculture 75	. . . 3
Botany	51 II.	2				Floriculture 53	. . . 4	Horticulture 50	. . . 5
Floriculture	50 I.	4				Botany 50	. . . 2		
Floriculture	51 II.	4							
Floriculture	52 III.	4	II.	To be announced.		Floriculture 51	. . . 4	Floriculture 76	. . . 3
Floriculture	53 I.	4				Botany 51	. . . 2	Floriculture 79	. . . 3
Floriculture	55 III.	3							
Floriculture	75 I.	3							
Floriculture	76 II.	3	III.	To be announced.		Floriculture 52	. . . 4	Floriculture 77	. . . 3
Floriculture	77 III.	3				Floriculture 55	. . . 3	Floriculture 80	. . . 3
Floriculture	79 II.	3						Horticulture 51	. . . 5
Floriculture	80 III.	3							
Horticulture	50 I.	5							
Horticulture	51 III.	5							
		48							

ADVISED. — The department advises all students who major in this subject to take Entomology 50 and Landscape Gardening 75.

LANDSCAPE GARDENING. (Major.)

Professor FRANK A. WAUGH, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

COURSE.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Floriculture	78 III.	3	I.	Drawing 25 Horticulture 25 . . . 8 Horticulture 50 . . . 9	50 . 5 Horticulture 50 . . . 5	Landscape Gardening 50 . 5 Horticulture 50 . . . 5	5	Landscape Gardening 75 . 3 Landscape Gardening 76 . 4 Landscape Gardening 78 or 79 . . . 3	3
Horticulture	50 I.	5							
Horticulture	51 III.	5							
Landscape Gardening	50 I.	5							
Landscape Gardening	51 II.	4	II.	To be announced.	51 . 4 Landscape Gardening 78 . 3	Landscape Gardening 51 . 4 Landscape Gardening 78 or 79 . . . 3	4	Landscape Gardening 80 . 4 Landscape Gardening 81 . 4	4
Landscape Gardening	52 III.	5							
Landscape Gardening	75 I.	3							
Landscape Gardening	76 I.	4							
Landscape Gardening	77 III.	4	III.	To be announced.	52 . 5 Horticulture 51 . . . 5 Floriculture 65 . . . 3	Landscape Gardening 52 . 5 Horticulture 51 . . . 5 Floriculture 65 . . . 3	5	Landscape Gardening 77 . 4 Landscape Gardening 82 . 4	4
Landscape Gardening	78 I.	3							
Landscape Gardening	79 I.	3							
Landscape Gardening	80 II.	4							
Landscape Gardening	81 II.	4							
Landscape Gardening	82 III.	4							
Landscape Gardening		4							
Landscape Gardening		56							

ADDITIONAL INFORMATION. — Modifications may be permitted when they appear advisable.

VEGETABLE GARDENING. (Major.)

Assistant Professor ROY D. HARRIS, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Agronomy	75 I.	5	I.	Drawing 25	 8	Agronomy 75	 5	Vegetable Gardening 75	. 5
Agronomy	77 II.	5		Horticulture 25	 9	Botany 50	 2		
Botany	50 I.	2							
Botany	51 II.	2	II.	To be announced.		Agronomy 77	 5	Vegetable Gardening 76	. 5
Vegetable Gardening	52 II.	5				Botany 51	 2		
Vegetable Gardening	53 III.	5				Vegetable Gardening 52	. 5		
Vegetable Gardening	75 I.	5	III.	To be announced.		Vegetable Gardening 53	. 5	Vegetable Gardening 77	. 5
Vegetable Gardening	76 I.	5							
Vegetable Gardening	76 II.	5							
Vegetable Gardening	77 III.	5							
		39							

ECONOMIC BOTANY. (Major.)
Professor A. VINCENT OSMUN, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.		Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany	.	52 I.	3	I.	Chemistry 25 . . . 9 French or German 25 or 28 ¹ 8		Botany 52 3		Botany 75 5	
Botany	.	53 II.	3				Botany 55 3		Botany 78 5	
Botany	.	54 III.	3				Chemistry 51 8		Botany 86 1	
Botany	.	55 I.	3							
Botany	.	56 II.	3	II.	To be announced.		Botany 53 3		Botany 76 5	
Botany	.	75 I.	5				Botany 56 3		Botany 79 5	
Botany	.	76 II.	5						Botany 82 3	
Botany	.	77 III.	5						Botany 87 1	
Botany	.	78 I.	5	III.	To be announced.					
Botany	.	79 II.	5				Botany 54 3		Botany 77 5	
Botany	.	80 III.	5						Botany 80 5	
Botany	.	82 II.	3						Botany 83 3	
Botany	.	83 III.	3						Botany 88 1	
Botany	.	86 I.	1							
Botany	.	87 II.	1							
Botany	.	88 III.	1							
Botany	.	51 I.	8							
Chemistry	.		62							

Selection of 45 credits of the above (Pathology 75, 76 and 77, Physiology 78, 79 and 80).
¹ German is advised.

AGRICULTURAL CHEMISTRY. (Major.)

Professor CHARLES A. PETERS, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry	51 I.	8	I.	Chemistry 25	9	Chemistry 51	8	Chemistry 76	5
Chemistry	52 II.	8		French or German	28			Chemistry 80	5
Chemistry	65 III.	5		To be announced.		Chemistry 52	8	Chemistry 77	3
Chemistry	76 I.	5						Chemistry 86	3
Chemistry	77 II.	5						Chemistry 92, 94	3
Chemistry	80 I.	5							
Chemistry	86 II.	3		To be announced.		Chemistry 62	5	Chemistry 87	3
Chemistry	87 III.	3				Chemistry 65	5	Chemistry 91, 93, 95	5
Chemistry	92 II.	3 ²							
Chemistry	94 II.	3 ²							
Chemistry	91 III.	5							
Chemistry	93 II.								
Chemistry	95 III.								
		50 ³							

¹ A knowledge of German is required.² Courses 92, 94 may be changed from 3 credits to an option of 3 or 5 credits. Students will select one course from groups 92, 94, and 91, 93, 95 respectively.³ Only 45 credits required.

ECONOMIC ENTOMOLOGY. (Major.)
Professor HENRY T. FERNALD, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.		Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Botany	.	50 I.	3	I.	Chemistry 25 French or German 25 or 28	9 8	Entomology 54 .	3	Entomology 76 .	5
or	.	52 I.	3				Entomology 53 .	5	Entomology 85 .	3
Botany	.	50 I.	3				Botany 50 or 52 .	3	Horticulture 50 .	5
Entomology	.	52 II.	3				Zoology 50 .	3		
Entomology	.	53 I.	5				or			
Entomology	.	54 I.	3	II.	To be announced.		Chemistry 51 .	8		
Entomology	.	55 III.	3							
Entomology	.	75 III.	4				Entomology 52 .	3	Entomology 77 .	3
Entomology	.	76 I.	5				Entomology 56 .	3	Entomology 90 .	3
Entomology	.	77 II.	3				Microbiology 50 .	5		
Entomology	.	78 III.	4	III.	To be announced.		Pomology 79 .	3		
Entomology	.	90 II.	3				Entomology 55 .	3	Entomology 78 .	4
Entomology	.	50 I.	3				Entomology 75 .	4	Horticulture 51 .	5
Zoology	.	54 II.	3				Entomology 65 .	5	Pomology 78 .	3
or	.	51 I.	8				Vegetable Gardening 50 .	3		
Chemistry	.		42 or 47							

The subjects (except Entomology) in the last two columns above are merely suggested as desirable to choose from.

MICROBIOLOGY. (Major.)

Professor CHARLES E. MARSHALL, *Adviser.*

(The heavy-faced type indicates the term in which the course is given.)

COURSE.	Number.	Credit.	Term.	Sophomore.	Credit.	Junior.	Credit.	Senior.	Credit.
Chemistry	51 I.	8	I.	Chemistry 25	9	Microbiology 50	5	Microbiology 81	5
Chemistry	52 II.	8		French or German 25 or 28	8	Chemistry 51	8	Microbiology 82	5
Microbiology	50 I.	5		To be announced.		Chemistry 52	5	Microbiology 75	5
Microbiology	50 II.		II.			Microbiology 50	5	Microbiology 80	5
Microbiology	50 III.								
Microbiology	51 II.	5	III.	To be announced.		Dairying 51	5	Microbiology 76	5
Microbiology	51 III.					Microbiology 50	5	Microbiology 83	5
Microbiology	52 III.	5				Microbiology 51	5		
Microbiology	81 I.					Microbiology 52	5		
Microbiology	82 I.	5							
Microbiology	83 III.								
Microbiology	80 II.								
Microbiology	75 II.	5							
Microbiology	51 III.								
Dairying	76 III.	5							
Microbiology									
		46							

ADDITIONAL INFORMATION. — Mathematics 50, 51 and 52 are recommended.

RURAL SOCIOLOGY. (Major.)
Professor JOHN PHELAN, *Adviser.*

[The heavy-faced type indicates the term in which the course is given.]

Course.	Sophomore.		Term.	Junior.		Senior.	Credit.
	Number.	Credit.		Number.	Credit.		
Agricultural Economics	50 I.	5	I.	Economic Sociology 25	9	Agricultural Economics 50	5
Agricultural Economics	52 II.	5		History and Gov't 25	8	Economic Sociology 75	5
Agricultural Economics	53 III.	5				Rural Sociology 79	1-3
Agricultural Economics	75 II.	5					
Economics and Sociology	51 I.	5	II.	To be announced.		Agricultural Economics 52	5
Economics and Sociology	50 II.	5				Agricultural Economics 75	5
Economics and Sociology	75 I.	5				Rural Sociology 77	3
Economics and Sociology	77 III.	5				Rural Sociology 80	1-3
Rural Journalism	55 III.	3	III.	To be announced.		Agricultural Economics 53	5
Rural Sociology	50 I.	3				Rural Sociology 81	1-3
Rural Sociology	51 II.	3					
Rural Sociology	53 III.	3					
Rural Sociology	77 II.	3					
Rural Sociology	79 I.	1-3					
Rural Sociology	80 II.	1-3					
Rural Sociology	81 III.	1-3					
		58-64					

DESCRIPTION OF COURSES.

DIVISION OF AGRICULTURE.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Freshman Agriculture.

1. **I.** A survey course, continuing throughout the year, intended to put the student in touch with agriculture in all its major aspects, dealing primarily with the problems of Massachusetts farms but not excluding the agriculture of the United States. One of the two study hours per week may be used for motion pictures.

1 class hour.

1 2-hour laboratory period, 2 study hours, credit, 5.

Professor REDMAN in co-operation with the

DIVISIONS of AGRICULTURE and HORTICULTURE.

2. **II.** As stated under Course 1 **I.**

1 class hour.

1 2-hour laboratory period, 2 study hours, credit, 5.

3. **III.** As stated under Course 1 **I.**

1 class hour.

1 2-hour laboratory period, 2 study hours, credit, 5.

Agronomy.

Professor BEAUMONT, Assistant Professor MICHELS, Mr. THELIN, Mr. THAYER, Mr. LANPHEAR.

The courses in agronomy are designed to present the fundamental knowledge concerning the soil and the principal products of the field. The basic course in soils is required of all students. The electives purpose to meet the needs of those specializing in soils and field crops and other specialized fields including both pure and applied science.

The laboratories for soils and fertilizers include one for elementary work, supplied with locker equipment for 200 students, and one for advanced work, accommodating 80 students. These laboratories are equipped with steam and electric ovens, balances, centrifuge, microscopes and other apparatus necessary for a study of soils and fertilizers. Storerooms, stock rooms, and balance rooms are conveniently near the laboratories. There is also a workroom attached, equipped with power machinery for grinding soils, fodders and the like.

The crops' laboratories include one for seed study, with lockers for 50 students, and a laboratory for the study of cereals, forage crops, roots, etc., with lockers for 64 students. The equipment of these laboratories includes steam ovens, constant temperature electric ovens, ovens for seed germination, Brown-Duval moisture apparatus, balances, microscopes, and collections of seeds, grasses, tubers, weeds, etc. A balance room, root cellar and two storerooms, one of which is mouse-proof, are also used for crop work.

A modern steam-heated greenhouse 25 by 35 feet, used for work in soils and crops, is a valuable part of the equipment. Near the greenhouse is a crop garden on which different varieties of corn, grasses, clovers, etc., are grown for demonstration purposes, and as a source of material for class work. In addition, the general college farm of 250 acres is used for field study in soils and crops, and as a source of material.

Required Courses.

25. **I. AGRONOMY.** — For sophomores. An introductory course designed to acquaint the student with the most important field crops and their production.
2 class hours. 2 2-hour laboratory periods, 3 study hours, credit, 9.

27. **III. SOILS AND FERTILIZERS.** — Sophomores. A study of soils and their properties, soil management, methods of soil improvement and maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments.
4 class hours. 1 2-hour laboratory period, credit, 5.
Professor BEAUMONT and the DEPARTMENT.
Prerequisite, Freshman-required Chemistry.

Elective Courses.

50. **I. FIELD AND FORAGE CROPS.** — For juniors; seniors may elect. History, classification and production of corn and of those grasses, legumes, root and tuber crops suited to New England conditions. Crops of less importance in New England are briefly considered. The work includes lecture, laboratory and field study.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Assistant Professor MICHELS and Mr. THELIN.
Prerequisites, Agronomy 27, Botany 3.

51. **III. ADVANCED FIELD CROPS (1923-24).** — For juniors; seniors may elect. Study of the cereals and other field crops not taken up or only briefly considered in Course 50. General problems of crop production are also considered, and the work is not entirely confined to New England conditions. The laboratory work includes a study of the cereals, the quality of seeds, grains and crop products, crop problems and field work with such crops as are available. Given in alternate years.
2 class hours. 1 2-hour laboratory period, credit, 3.
Assistant Professor MICHELS and Mr. THELIN.
Prerequisite, Agronomy 50.

75. **I. ADVANCED SOILS.** — For seniors; juniors may elect. A field, lecture and laboratory course on soils and their adaptability to different uses. The field work consists of a detailed study of soil textures, natural and spontaneous vegetation and other factors which indicate the fertility and adaptation of the soil; accompanied by a laboratory study of the physical properties of the soils sampled.
2 class hours. 1 4-hour and 1 2-hour laboratory period, credit, 5.
Professor BEAUMONT and the DEPARTMENT.
Prerequisite, Agronomy 27. Advised, Geology 27.

77. **II. MANURES AND FERTILIZERS.** — Seniors. An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Considerable attention is devoted to consideration of the experimental work which has been done, and which is now in progress. The laboratory work consists of a study of fertilizers, fertilizer mixtures, limes and culture work.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor BEAUMONT and Mr. LANPHEAR.
Prerequisite, Agronomy 27. Advised, Chemistry 27.

78. **II. BREEDING OF FIELD CROPS (1924-25).**—Seniors. Deals with the improvement, by selection and breeding, of the crops studied in Course 50. Given in alternate years.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MICHELS.

Prerequisite, Agronomy 50.

Animal Husbandry.

Professor —, Assistant Professor RICE, Assistant Professor GLATFELTER, MR. THAYER.

It is the purpose of this department to present comprehensive information on the subject of animal husbandry. The first courses are studies of the breeds, types and market classes of live stock. These are followed by courses in judging, breeding and management.

The department is equipped with an excellent laboratory, Grinnell Arena, which has a seating capacity of 180. The equipment for classroom instruction includes upwards of 125 head of dairy cattle which are superior representatives of Jersey, Guernsey, Ayrshire and Holstein breeds; considerable numbers of Berkshire and Chester White pigs; pure-bred Percherons; and several work teams of various types. The department has a collection of plaster of Paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine; and a set of over 250 lantern slides portraying the leading prize-winning producing and breeding animals of the principal breeds of horses, cattle, sheep and swine. There is also a collection of the different foodstuffs available for the use of New England farmers. All this equipment is being added to from time to time as funds are available.

Elective Courses.

25. **I. LIVESTOCK JUDGING AND MARKET CLASSES OF FARM ANIMALS.**—A study of the principles governing the selection of animals for market, feed lot, breeding, milk production and work, including the use of the score card and the comparative judging of the various types of livestock. Text book, Vaughn's Types and Market Classes of Farm Animals.

1 class hour.

2 2-hour laboratory periods, 3 study hours, credit, 8.

26. **II. TYPES AND BREEDS OF LIVESTOCK.**—A course covering the origin, history, development and characteristics of the different breeds of horses and sheep. Text book, Plumb's Types and Breeds of Farm Animals.

2 class hours.

1 2-hour laboratory period, credit, 3.

50. **I. FEEDS AND FEEDING.**—For juniors. A study of the principles of animal nutrition; of the composition and qualities of feeding materials. Textbook, Henry's "Feeds and Feeding."

3 class hours.

Credit, 3.

Assistant Professor RICE.

Prerequisite, Chemistry 30 or 6.

51. **II. FEEDS AND FEEDING.**—For juniors. A study of feeding practice as related to all farm animals. Considerable work will be given in the formulating of rations.

3 class hours.

Credit, 3.

Assistant Professor RICE.

Prerequisite, Animal Husbandry 50.

52. **III. ADVANCED STOCK JUDGING.** — For juniors; seniors may elect. Designed to equip students in the judging of classes of different types of live stock; to strengthen them in the selection of superior sires; and equip them for stock judging at fairs. Visits are made to the best herds for the various breeds of stock in the State. Judging teams to represent the college will be selected from this class.

1 2-hour and 1 4-hour laboratory period, credit, 3.

Professor —

Prerequisites, Animal Husbandry 25 and 26.

53. **III. PRINCIPLES OF BREEDING.** — For juniors; seniors may elect. Designed to familiarize students with the problems that are involved in animal improvement; to acquaint them with the facts which are already established; to scrutinize prevailing theories; and to indicate the lines and methods of further work. Some of the subjects studied are: variations, their causes and heritability; DeVrie's theory of mutations; the inheritance of acquired characters; the pure line; Mendelian law; the making of new types; the determination of sex; applications to human heredity. A few periods at the end of the course are devoted especially to the application of principles in live-stock improvement. Supplementary reading.

3 class hours.

Credit, 3.

Assistant Professor RICE.

Prerequisites, Animal Husbandry 25, 26, Zoölogy 25.

75. **I. BEEF AND SWINE PRODUCTION.** — A study of the leading breeds of beef cattle and swine, together with the work of some of the most successful breeders. Considerable time will be given also to the production of commercial beef and pork. In this course such livestock management problems as apply to beef cattle and swine will be included.

2 lectures.

1 2-hour laboratory period, credit, 3.

Assistant Professor GLATFELTER.

Prerequisites, Animal Husbandry 51, 52 and 53.

78. **II. HORSE AND SHEEP PRODUCTION.** — A study of the production of these animals planned in the same manner as that of the previous course.

2 lectures.

1 2-hour laboratory period, credit, 3.

Professor —

Prerequisites, Animal Husbandry 51, 52 and 53.

79. **III. DAIRY CATTLE AND MILK PRODUCTION.** — A study of the leading breeds of dairy cattle, the most successful breeders and famous breeding animals, advance registry testing and feeding for production, sales methods and advertising.

2 lectures.

1 2-hour laboratory period, credit, 3.

Professor —

Prerequisites, Animal Husbandry 51, 52 and 53.

81. **II. DAIRY AND ANIMAL HUSBANDRY.** — Seminar for seniors majoring in dairying and animal husbandry.

1 class hour.

Credit, 1.

DEPARTMENTS OF DAIRYING AND ANIMAL HUSBANDRY.

82. **III.** A continuation of Course 81.

1 class hour.

Credit, 1.

DEPARTMENTS OF DAIRYING AND ANIMAL HUSBANDRY.

Dairying.

Professor JUDKINS, Assistant Professor YAXIS, Mr. PENDLETON, Mr. SMITH.

The dairy manufactures building is new, well lighted and of sanitary construction. It is designed and equipped especially for teaching dairy manufactures. The equipment includes all kinds of machinery that are considered essential to the proper handling of milk and the making of cream, butter, ice cream and soft cheeses.

Course 77 is for students who desire a general idea of dairy work and manufacturing processes. Part of the courses are arranged to give instruction in general dairy work as associated with Massachusetts agriculture; part are arranged to give to a smaller group of students more complete work in dairy manufactures. Those majoring in dairy manufactures should have at least one summer's experience in a commercial plant before graduation.

Elective Courses.

50. **I. MILK AND MILK COMPOSITION.**—For juniors; seniors may elect. The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; methods for testing herds and developing them to higher efficiency; problems.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor YAXIS.

51. **III. MARKET MILK.**—For juniors; seniors may elect. A study of market-milk conditions; extent and development of the business; supply and delivery; food value of milk and its uses as food; milk and its relation to the public health; proper methods for handling milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection. Some milk plants will be visited.

3 class hours.

1 4-hour laboratory period, credit, 5.

Professor JUDKINS and Mr. SMITH.

Prerequisites, Dairying 50, Microbiology 50.

52. **II. JUDGING DAIRY PRODUCTS.**—For juniors.

2 2-hour laboratory periods, credit, 2.

Professor JUDKINS.

75. **II. BUTTER MAKING.**—For seniors; juniors may elect. A study of separators and cream separation; handling milk and cream for butter making; preparation of starters, and ripening cream; churning; markets and their requirements; marketing, scoring and judging butter; management; dairy machinery and care thereof; problems.

2 class hours.

2 3-hour laboratory periods, credit, 5.

Assistant Professor YAXIS.

Prerequisite, Dairying 50.

76. **III. ICE CREAM MAKING.**—For seniors; juniors may elect. A study of the principles and practice of ice cream making. Laboratory equipment is modern and the laboratory instruction will cover commercial practices. Some ice cream plants will be visited.

2 class hours.

2 3-hour laboratory periods, credit, 5.

Mr. PENDLETON.

Prerequisite, Dairying 50.

77. **III. DAIRYING.** — For seniors; juniors may elect. A general course primarily for those who wish to take only one course in dairying. The work covers briefly the composition and secretion of milk, the Babcock fat test, the relation of bacteria to dairy work and principles of creaming; separators; elementary butter making; proper methods of handling milk and cream; and the relation of market milk to the public health.

3 lecture hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor YAXIS.

78. **I. MILK PRODUCTS.** — For seniors. The manufacture of milk products other than butter and ice cream, including cheddar cheese, soft and fancy cheese, condensed and powdered milk, casein, commercial buttermilk, etc. Laboratory exercises largely in cheese making and commercial buttermilk manufacture.

1 4-hour laboratory period, credit, 2.

Assistant Professor YAXIS.

Prerequisite, Dairying 50.

Farm Management.

Professor FOORD, Assistant Professor ABELL.

The purpose of the courses in this department is to present various considerations of farming as a business. This involves a knowledge of the cost of production and the profit from the different enterprises such as dairy, poultry or orchard; a study of the enterprises, and the relative amounts of each that will give the best use of labor and equipment on the farm under consideration.

The college farm of 250 acres is under the general supervision of the Department of Farm Management, and furnishes demonstration material. It includes improved land, pasture land and a farm woodlot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied. The offices of the department are in Stockbridge Hall.

Elective Courses.

75. **II. FARM ACCOUNTS AND COST ACCOUNTING.** — For seniors; juniors may elect. A study of farm inventories, single-enterprise accounts, complete farm accounts and farm records. Special emphasis is given to the interpretation of results and their application in the organization and management of the farm.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor FOORD.

76. **I. FARM MANAGEMENT.** — For seniors; juniors may elect. A study of farming as a business; regions and types of farming; the general principles of farm management and the influence of size, production, live stock and crop farming on the farmer's labor income; arrangement of fields and buildings; use of land, capital and labor; choosing and buying a farm.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor ABELL.

Prerequisites, Agronomy 50, Animal Husbandry 25 and 26, and some farm experience.

77. **III. FARM MANAGEMENT.** — For seniors; juniors may elect. A further and more specific study of the principles and practices as outlined in Course 76, with refer-

ence to their application to different regions of the United States and especially to New England. Trips to successful farms are a required part of the course.

1 class hour.

1 4-hour laboratory period, credit, 3.

Professor FOORD.

Prerequisites, Farm Management 75 and 76.

78. **II. SEMINAR.** — For seniors majoring in general agriculture; others by arrangement.

1 class hour.

Credit, 1.

Professors FOORD and ABELL.

79. **III. SEMINAR.** — For seniors majoring in general agriculture; others by arrangement.

1 class hour.

Credit, 1.

Professors FOORD and ABELL.

81. **III. FARMING IN THE UNITED STATES.** — For seniors. A study of the agricultural regions of the United States and the different types and methods of farming carried on in each. The economic reasons for the establishment and maintenance of each type will be considered.

2 2-hour laboratory periods, credit, 2.

The DEPARTMENT.

Prerequisite, Farm Management 76.

Poultry Husbandry.

Professor GRAHAM, Professor SANCTUARY, Assistant Professor BANTA, Miss PULLEY.

The introductory courses (50, 51, 52) give a knowledge of the general routine of elementary poultry keeping. The advanced studies prepare men for the successful operation of poultry plants, either as owners or managers. Graduate work, preparation for further teaching, extension or investigation.

The poultry plant consists of 8 acres of land sloping gently to the west. The buildings consist of three incubator cellars equipped with a number of lamp incubators and two mammoth machines with a total capacity of 9,000 eggs; a pipe brooder house (open pipe system) and 40 colony brooder houses which give a brooding capacity for 7,000 chicks, the equipment for these houses including a large variety of coal-stove brooders and kerosene hovers; a long laying house 14 by 180 feet, which accommodates 500 layers, furnishing facilities for student work in pen management, utility and fancy judging, etc.; and a laboratory 14 by 80, for killing, picking, drawing, trussing, packing, crate fattening and cramming. The fattening equipment consists of a modern sanitary all-steel battery with 16 compartments and 10 wooden crates, accommodating, altogether, 350 birds. There are also a storage building, 28 by 64 feet, for root cellar, poultry carpentry, poultry mechanics, feed room and storage; an experimental breeding house, 18 by 60; a combination laying, testing and breeding house, 18 by 72, for experimental purposes; a model laying house, 18 by 30, for 100 hens, and a house 20 by 40, for 200 hens. The six old experiment-station houses, each 12 by 18 feet, are used as special mating and overflow pens. The total capacity for laying hens is 1,600. A manure shed 14 by 18 feet; an oil and tool house 10 by 12; an incinerator 10 by 10; and two backyard model poultry houses 8 by 10 and 8 by 8 give a total of 76 buildings, not including a pheasant run, 16 roosting sheds 10 by 10, and numerous small coops for natural incubation and brooding.

Elective Courses.

50. **I. JUDGING AND CULLING.**—Seniors. A study of the origin and evolution of our standard breeds and varieties. Judging for production quality, using trapped birds; culling the flock; judging exhibition quality by score card and comparison. Several farms will be visited, also several of the leading Connecticut Valley Poultry Shows. Poultry Judging Teams competing in the Intercollegiate Contest at Madison Square Garden are trained in this course.

2 class hours.

2 3-hour laboratory periods, credit, 5.

Assistant Professor BANTA.

Prerequisite, Poultry 52.

51. **II. POULTRY FEEDS AND FEEDING.**—For juniors; seniors may elect. A study of the principles and practices of poultry nutrition and their relationship to other poultry problems. An important part of the work will be the practical management of a pen of birds for a period of weeks, including observations and detailed record keeping.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor BANTA.

52. **III. INCUBATION, BROODING AND GROWING.**—For juniors; seniors may elect. A study of the fundamental principles of incubation and rearing chicks; also of modern equipment, including small and mammoth incubators and various types of brooding apparatus.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor SANCTUARY and Miss PULLEY.

Prerequisite, Poultry 51.

75. **I. POULTRY HOUSING AND SANITATION.**—For juniors; seniors may elect. A consideration of the biological and economic principles fundamental in the efficient designing, practical construction and equipping poultry farm buildings; also of external parasites and the insecticidal agents for their control.

3 class hours.

Credit, 3.

Assistant Professor BANTA.

Prerequisite, Poultry 50.

76. **I. MARKET POULTRY AND POULTRY PRODUCTS.**—Seniors. A study of the market classes of poultry, eggs and feathers, the requirements of different markets, methods of marketing, the cold storage of poultry and eggs. Preserving eggs, judging and scoring of live and dressed market poultry and market eggs are important features. Students are required to fatten pens of chickens by different methods and rations, keeping accurate data of the gains in weight and quality, also the costs of feed and labor, and resultant profit or loss. The annual market poultry show is staged under the direction of members of this class.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor GRAHAM and Miss PULLEY.

Prerequisite, Poultry 52.

77. **II. POULTRY BREEDING.**—Seniors. A study of the principles of breeding and their application to poultry. Practice work in record keeping, pedigree hatching, stud and flock mating will be required as the season permits.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professor SANCTUARY.

78. **III. FARM POULTRY.**—Seniors; juniors may elect. For those students who desire a general knowledge of poultry husbandry but who cannot devote more

than one term to the subject; it is not intended for students specializing in poultry, and such students are admitted only by special permission. Emphasis is placed on the farm flock and its economic management. Utility classification, housing, culling, feeding, hatching, rearing, production, marketing and disease control receive special consideration.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor BANTA.

79. **III. POULTRY FARM ORGANIZATION.** — Seniors. A study of the organization of the poultry farm for greatest efficiency. The layout of fields and buildings, crop rotations, records, accounts and advertising will receive consideration. One or more trips will be made to representative successful poultry farms.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professor GRAHAM.

Prerequisite, Poultry 77.

Rural Engineering.

Professor GUNNESS, Assistant Professor STRAHAN, Mr. PUSHEE, Mr. NEWLON.

The courses in rural engineering are planned to give a working knowledge of those phases of engineering which apply directly to the farm. It is expected that the student will acquire a clear understanding of modern farm practice as it relates to permanent improvements of the farm and the farmstead, and in the selection and use of farm equipment.

This department has an office and the use of a lecture room in Stockbridge Hall. The work on farm structures is given in the large drawing room in the same building. This room is fitted with thirty drawing tables. Models and blue prints are available for the study of farm buildings. A set of post molds and a machine for making cement tile afford opportunity for practical work with cement.

The rural engineering shop is a one-story structure 68 by 126 feet. The carpenter shop in this building is fitted with benches fully equipped with tools for each student. The general repair shop is equipped with forges, benches, a drill press and grinders. The laboratory for farm machinery and farm motors is equipped with a complete line of field machines, gasoline engines, tractors and pumps. A complete assortment of engine accessories, consisting of carburetors, magnetos, etc., is available for thorough instruction in gas engines. A small dynamo and switchboard are used in the study of farm-lighting systems. The work on the small field machines is given in the basement of Stockbridge Hall, and the work on steam engines and steam heating is given in Flint Laboratory.

Elective Courses.

25. **I. CARPENTRY.** — For sophomores; juniors and seniors may elect. Practice in the use of tools by exercises in bench work, repair of farm equipment and farm building construction. Not given, I term, in 1923-24.

2 2-hour laboratory periods, credit, 2.

Mr. PUSHEE.

26. **III. REPAIR OF FARM EQUIPMENT.** — For sophomores; juniors and seniors may elect. Exercises in forge work, pipe fitting, soldering, babbitting and fitting bearings, lining up shafting, lacing belts and splicing rope. Practice in the use of machinist's tools, such as file, cold chisel, drill press, taps and dies.

2 2-hour laboratory periods, credit, 2.

Mr. NEWLON.

52. **III. FARM ENGINEERING.** — A general course dealing with field implements, gas engines, water supply, lighting, sewage disposal, farm buildings, drainage and irrigation.

3 class hours.

2 2-hour laboratory periods, credit, 5.

The DEPARTMENT.

75. **I. FARM STRUCTURES.** — For seniors; juniors may elect. A study of the strength and durability of concrete, wood, stone, and clay products, and of the mechanical principles underlying their use in farm construction. The design of various farm buildings, such as the general purpose barn, dairy stable, hog house, sheep barn, milk house, etc. In the drafting room, details of construction will be worked out, a study of the mechanics of simple roof trusses will be made, and a complete design of some major farm building will be finished in all essential details. If time permits, blueprints of the finished design can be made.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Assistant Professor STRAHAN.

78. **II and III. FARM MOTORS.** — This course deals with the gasoline engine as used for stationary work, automobiles, and tractors. Instruction is given by means of lectures and textbooks, and by operating and repairing stationary engines, automobiles, and tractors. Special attention is given to overhauling and repairing.

3 class hours.

2 2-hour laboratory periods, credit, 5.

The DEPARTMENT.

79. **III. DRAINAGE AND IRRIGATION ENGINEERING.** — For seniors; juniors may elect. Covers the engineering phase of drainage and irrigation. The various systems are studied, and practice is given in the design of drainage and irrigation systems. Field work gives practice in surveying for drains, platting, locating drains, erecting batterboards and laying tile. Practice is given in assembling equipment for spray irrigation, and the flow of water through nozzles is studied by means of laboratory tests.

2 class hours.

1 2-hour and 1 4-hour laboratory period, credit, 5.

Assistant Professor STRAHAN.

81. **III. DAIRY MECHANICS.** — A study of dairy machinery, including steam boilers, engines, pumps, traps, refrigeration machinery, and heat-controlling devices. Practice is given in pipe fitting, packing valves, lacing belts, and similar repair jobs on the equipment used in dairy plants.

1 lecture.

1 4-hour laboratory period, credit, 3.

Professor GUNNESS and Mr. NEWLON.

DIVISION OF HORTICULTURE.

Professor WAUGH.

[Heavy-faced Roman numerals indicate the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Floriculture.

Professor THAYER, Assistant Professor MULLER.

The courses in floriculture are intended to present a general knowledge of all phases of greenhouse design, construction, heating and management, the culture of florists' crops (under glass and in the field), floral decoration and arrangement. The department aims to train students so that they may take up commercial floriculture (either

in the growing or retail business) and the management of conservatories on private estates, in parks and cemeteries.

The department is especially well equipped for the teaching work, probably being surpassed in no other agricultural college. French Hall, with its laboratories, classrooms and offices, furnishes excellent facilities for the purposes of instruction. The glass area of the department consists of approximately 20,000 square feet, divided as follows: French Hall range of 7,200 square feet, a durable, practical, commercial range composed of palm and fern, violet, carnation, rose and students' houses; the old Durfee range of 7,400 square feet, devoted to the growing of decorative, conservatory and bedding plants and chrysanthemums; one house of 3,200 square feet, suitable for propagating work and general plant culture; and approximately 2,200 square feet in cold frames and hotbeds.

In addition, the department has 2 acres of land used for the summer culture of carnations, violets, gladioli, dahlias, sweet peas, bedding plants, etc. This also includes a small garden of about 4,700 square feet devoted to the culture of annuals. A large collection of biennials and herbaceous perennials is maintained and is being enlarged from year to year; at the present time the collection consists of several hundred species and varieties, and provides an excellent opportunity for the study of garden flowers.

Elective Courses.

50. **I. GREENHOUSE MANAGEMENT.**—For juniors; seniors may elect. Designed to familiarize students with the methods followed in the management of greenhouses and of greenhouse crops and the principles underlying the same; history and development of the floricultural industry; preparation of soils; fertilizers; potting; watering; ventilation; control of insects and diseases; methods of plant propagation; forcing of plants. At some time during the term the members of the class will be required to take a one-day trip to visit large commercial establishments. Lectures, assigned readings, reports and laboratory practice.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor THAYER.

Prerequisite, Horticulture 27.

51. **II. GREENHOUSE MANAGEMENT.**—For juniors; seniors may elect. Continuation of Course 50. Several field trips, to study floricultural establishments in the vicinity, will be made during the laboratory periods.

2 class hours.

1 4-hour laboratory period, credit, 4.

Professor THAYER.

52. **III. FLORAL ARRANGEMENT.**—A study of the principles underlying the arrangement and use of cut flowers and plants; funeral designs, basket and vase arrangement, table decorations, home, church and all interior decorations; a study of color as applied to such work. Lectures, assigned readings and reports. This course will be limited to ten students.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Professor THAYER.

53. **I. GREENHOUSE CONSTRUCTION AND HEATING.**—For juniors; seniors may elect. The location, types, arrangement, construction, cost, equipment, heating and ventilating of greenhouse structures; the drawing of plans and study of specifications for commercial houses and conservatory ranges. Such practical work as glazing and the construction of concrete benches and cold frames is included as facilities allow. Lectures, assigned readings and problems.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professor THAYER.

55. **III. GARDEN FLOWERS AND BEDDING PLANTS.** — Juniors and seniors. A study of the annuals, biennials, herbaceous perennials, bulbs, bedding plants and roses that are valuable for use in floricultural or landscape gardening work. Methods of propagation, culture and uses of the various plants are considered; identification of material. Lectures, assigned readings and reports.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professors THAYER and MULLER.

75. **I. COMMERCIAL FLORICULTURE.** — Seniors. A detailed study of the important commercial cut flower crops and potted plants. Visits will be made to commercial establishments during the term. The lectures are supplemented with textbooks and assigned readings.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MULLER.

Prerequisite, Floriculture 51.

76. **II. COMMERCIAL FLORICULTURE.** — Seniors. As stated under Course 75.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MULLER.

Prerequisite, Floriculture 75.

77. **III. COMMERCIAL FLORICULTURE.** — Seniors. As stated under Course 75.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor MULLER.

Prerequisite, Floriculture 76.

79. **II. CONSERVATORY PLANTS.** — Seniors. A study of the foliage and flowering plants used in conservatory work; methods of propagation, culture, use and arrangement; identification of plants. Lectures, assigned readings and reports.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THAYER.

Prerequisite, Floriculture 51.

80. **III. SEMINAR.** — For seniors majoring in floriculture. Advanced study of subjects pertaining to some phase of floriculture. All students are assigned specific problems and pursue study in these problems by reading and research; the results of this study must be presented in the form of a thesis. Seminars are conducted weekly.

2 to 6 laboratory hours, not to exceed 3 credits.

Professor THAYER.

Forestry.

Professor GROSE.

The forestry courses are intended primarily for prospective owners or managers of farm woodlots, and the field work is focused on typical New England problems. These courses are broad enough, however, to furnish valuable preparation for students planning to study forestry in graduate schools.

The department has an unusually complete equipment of the various instruments used in forest mensuration, forest mapping and engineering, timber estimating, log scaling, board measuring, etc.; and a large assortment of boards illustrative of the various commercial woods found in the lumber markets. The State Forest Nursery, comprising 6 acres of land and containing, approximately, 5,000,000 trees, transplants and seedlings, is on the college farm. Forests containing every variety of tree common to New England are within walking distance of the college. The college campus affords an arboretum containing a large number of trees not native to New England. The

Mount Toby Demonstration Forest has an area of approximately 750 acres, and contains the various types of forest growth found throughout the State. It serves as a field laboratory in which students have the privilege of working out problems in silviculture, forest mensuration and management. Improvement cuttings, cuttings for utilization, and forest plantings are conducted by the department.

55. **I. WOODLOT FORESTRY: ESTIMATING AND BUSINESS MANAGEMENT.** — For juniors and seniors. Topics: forest mapping; timber-cruising, determining rate of growth and possible cut; financial returns; forest taxation; our national timber supply, present and future.

1 2-hour and 1 4-hour laboratory period, credit, 3.
Professor GROSE.

56. **II. WOODLOT FORESTRY: LOGGING, MILLING AND MARKETING.** — For juniors and seniors. Topics: felling trees; sawing logs; hauling logs; the portable mill; the stationary mill; seasoning, measuring and shipping lumber; lumber grades and prices; legal forms; by-products of the woodlot; adaptability of species to uses; wood-using industries of Massachusetts.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor GROSE.

57. **III. WOODLOT FORESTRY: TIMBER-RAISING.** — For juniors and seniors. Topics: forest planting; weeding; release cuttings; pruning; thinning; salvage cutting; protection from insects, fungi, fire, etc.; final cutting methods for natural reproduction of the forest.

1 2-hour and 1 4-hour laboratory period, credit, 3.
Professor GROSE.

58. **III. WOODLOT FORESTRY: BRIEF SURVEY.** — A condensation of Courses 55, 56 and 57 for those who have only one term to give to forestry.

2 class hours. 1 2-hour laboratory period, credit, 3.
Professor GROSE.

Horticultural Manufactures.

Professor CHENOWETH, Mr. ROBERTSON.

The courses aim to give a practical knowledge of the problems connected with food preservation. Emphasis is placed upon the conservation of the cheaper grades of fruits and vegetables, to the end that the whole crop may be marketed at a profit and that wholesome food products may result from what would otherwise be lost. The social and economic values of this work are constantly emphasized.

The department occupies three laboratory rooms in Flint Laboratory, two in Fisher Laboratory, with offices in Wilder Hall and French Hall. The general equipment of the department, both for the use of students and for manufacturing purposes, may be grouped under the following heads: —

1. *Canning.* — A modern canning outfit, including both steam-pressure cookers and hot-water baths, hand and power can sealers, peeling and slicing machines, a string bean cutter, heat-penetration thermometers, electric incubator and a large assortment of all types of home canning equipment.

2. *Evaporation.* — Two small orchard evaporators, a tunnel drier, peeling machines, slicers and a general assortment of driers adapted to home evaporation.

3. *Fruit Juices, Butters, etc.* — A hand cider mill, a motor-driven hydraulic press, a steam-jacketed kettle, an apple-butter cooker, and cider and vinegar testing apparatus.

Elective Courses.

75. **I. HORTICULTURAL MANUFACTURES.** — For seniors and graduate students. A practical course in food preservation dealing primarily with fruits and vegetables. The canning of fruits and vegetables as practiced in the home and in commercial canneries; evaporation of fruits and vegetables, the various types of equipment and methods of preparation of products. The manufacture of (a) fruit products, such as butters, jams, jellies, fruit juices, marmalades, preserves, vinegars, pastes, etc.; (b) vegetable products, as pickles, piccalilli, sauerkraut, soups, etc. Particular attention is given to study and use of all types of equipment suitable for use in the home or small factory, together with methods for testing a large variety of manufactured products. The emphasis is on canning, drying and study of equipment.

2 class hours. 3 2-hour laboratory periods per week, credit, 5.
Professor CHENOWETH.

76. **II. HORTICULTURAL MANUFACTURES.** — For seniors and graduate students. A continuation of Course 75. The emphasis in this course is placed on the manufacturing and testing of fruit and vegetable products.

1 class hour. 2 laboratory periods per week, credit, 3.
Professor CHENOWETH.

Prerequisite, Horticultural Manufactures 75.

77. **III. HORTICULTURAL MANUFACTURES.** — Continuation of courses 75 and 76, dealing primarily with maple products, the canning of meats and spring vegetables, and studies of special problems involved in establishing and operating home and farm factories.

2 2-hour periods per week, credit, 2.
Professor CHENOWETH.

78. **III. HORTICULTURAL MANUFACTURES.** — For seniors and graduate students. A general course in food preservation, including lectures, readings and laboratory work in the canning and evaporation of fruits and vegetables, the manufacture of fruit and vegetable products. Special emphasis will be given to the conservation of the low grade fruits and vegetables in the home and in the farm factory.

2 class hours. 2 2-hour laboratory periods, credit, 4.
Professor CHENOWETH.

Horticulture.

Professor WAUGH, Professor THOMPSON, Assistant Professor ROGERS, Assistant Professor DICKINSON.

The general subject of horticulture divides naturally into subjects of pomology, floriculture, forestry, landscape gardening and vegetable gardening. A number of courses relate to more than one of these subjects, and are therefore grouped here under the general designation of horticulture.

Required Course.

25. **I. TAXONOMY AND ECOLOGY OF HORTICULTURAL PLANTS.** — A study of the outstanding botanical characters of the principal families, general species and varieties of cultivated plants; together with a consideration of those principles of ecology utilized in the cultivation of plants.

1 class hour. 2 2-hour laboratory periods, 4 study hours, credit, 9.
Professor THOMPSON.

Elective Courses (General).

27. **III. NURSERY PRACTICE.** — For sophomores; juniors and seniors may elect. Treats of the fundamental methods of plant propagations by seeds, cuttings, budding, grafting, etc. Lectures and practicums.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor THOMPSON.

50. **I. PLANT MATERIALS.** — For juniors; seniors may elect. Aims to make the student familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor THOMPSON.

Prerequisite, Horticulture 27.

51. **III. PLANT MATERIALS.** — For juniors; seniors may elect. A continuation of Course 50, taking up the field use of trees, shrubs and herbaceous plants, their native habitats, soils and plant associations, with a view to supplying to students in landscape gardening and floriculture a knowledge of plant species. Frequent practicums and field excursions.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor THOMPSON.

Prerequisite, Horticulture 50.

Landscape Gardening.

Professor WAUGH, Assistant Professor HARRISON.

The purposes of the courses are: (1) To train men for the profession in all its branches. As a rule graduates should first enter the employ of established landscape architects, nurserymen or park superintendents, and after an apprenticeship of several years those who have the requisite technical and business ability may set up for themselves. (2) To train men for public-service work in national, State and municipal parks and forests. (3) To train men for country planning, this function being exercised through various public institutions and organizations. (4) To train teachers and extension workers in lines of landscape gardening and civic improvement. (5) To give a broad and liberal general education stressing the fundamental principles of art.

The department has large, well-lighted drafting rooms, with necessary equipment, such as planimeters, eidograph, pantograph, blue-printing outfit, etc.; and a complete outfit of surveying instruments, including transits, levels, plane tables, prismatic compasses, hand levels, etc. The college campus presents an unusually good collection of the plant materials used in landscape gardening.

Elective Courses.

50. **I. MAPPING AND TOPOGRAPHY.** — Juniors. Reconnaissance surveys and mapping, with special reference to the methods used in landscape gardening; detailed study of selected designs of leading landscape gardeners; grade design, road design and field work. Must be followed by Course 51.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.

Assistant Professor HARRISON.

Prerequisites, Mathematics 26 and 27, Drawing 25, 26 and 27, Horticulture 27.

51. **II. ELEMENTS OF LANDSCAPE GARDENING.** — Juniors. As stated under Course 50.

3 3-hour laboratory periods, credit, 4.
Assistant Professor HARRISON.

Prerequisite, Landscape Gardening 50.

52. **III. GENERAL DESIGN.** — Juniors. Field notes; examination of completed works and those under construction; design of architectural details, planting plans, gardens, parks and private grounds; written reports on individual problems.

2 2-hour laboratory periods; 2 3-hour laboratory periods, credit, 5.
Assistant Professor HARRISON.

Prerequisites, Landscape Gardening 50 and 51, and either plant materials (Horticulture 50 and 51) or advanced mathematics.

75. **I. THEORY OF LANDSCAPE ART.** — For seniors and graduates. The general theory and applications of landscape study, including a brief history of the art.
3 class hours.

Credit, 3.
Professor WAUGH.

76. **I. CIVIC ART.** — Seniors. The principles and applications of modern civic art, including city planning, city improvement, village improvement and rural improvement, with special emphasis upon country planning. Must be followed by Course 77.

3 3-hour laboratory periods, credit, 4.
Assistant Professor ROGERS.

Prerequisite, Landscape Gardening 52.

77. **III. COUNTRY PLANNING.** — Seniors. As stated under Course 76.

3 3-hour laboratory periods, credit, 4.
Professor WAUGH.

Prerequisite, Landscape Gardening 76.

78. **I. ARCHITECTURE.** — Alternating with Course 79; given in 1924–25. Juniors and seniors. The history of architectural development, the different historic types, with special reference to the underlying principles of construction and design and their relations to landscape design. Illustrated lectures, conferences, practice in designing,
3 class hours.

Credit, 3.
Assistant Professor HARRISON.

79. **I. CONSTRUCTION AND MAINTENANCE.** — Alternating with Course 78; given in 1923–24. Juniors and seniors. Detailed instruction in methods of construction and planting in carrying out plans, in organization, reporting, accounting, estimating, etc.; maintenance work in parks and on estates, its organization, management, cost, etc.
3 class hours.

Credit, 3.
Assistant Professor HARRISON.

80. **II. THEORY OF DESIGN.** — Juniors. As stated under Course 52. [Will be given in the summer term when that is established; meantime, will be given in term I, senior year.]

120 laboratory hours, credit, 4.
Professor WAUGH.

Prerequisite, Landscape Gardening 52.

81. **II. ESTATE DESIGN.**

3 3-hour laboratory periods, credit, 4.
Assistant Professor HARRISON.

82. **III. PARK DESIGN.**

3 3-hour laboratory periods, credit, 4.
Assistant Professor HARRISON.

Pomology.

Professor SEARS, Professor VAN METER, Assistant Professor DRAIN, Mr. FRENCH, Mr. RALEIGH.

The object of the courses is to give a training which shall be thoroughly practical and yet scientific. This will fit the men to enter the field of practical fruit-growing, or it will furnish an excellent foundation for further study.

The department has 50 acres in fruit plantations. The apple orchards comprise about 35 acres, and there are blocks of pears, peaches, plums and cherries. In small fruits there are plantings of strawberries, raspberries, blackberries, currants and gooseberries. There are three vineyards, with a total area of 5 acres, in which the leading varieties and the principal types of pruning and training are represented. In these plantations are 50 varieties of grapes, representing three native American species and many hybrids; 20 varieties of peaches; 20 varieties of pears; 25 of plums, including five species and many hybrids; and 100 varieties of apples.

The department has an excellent equipment of spraying and dusting machinery, including various styles and sizes of power sprayers, and many types of barrel pumps and smaller sprayers. There is also an excellent assortment of orchard tools, including plows, harrows, fertilizer sowers, etc.

Fisher Laboratory is one of the best planned and equipped packing and storage plants in the United States. It includes six refrigerated rooms; four storage rooms not refrigerated; one large laboratory room and one classroom, besides ample storage room for fruit packages and equipment. The equipment for the building itself includes four types of apple sizers; packing tables and box and barrel presses of various types, besides all kinds of packages and the smaller equipment necessary for thoroughly modern work in grading and packing fruit. The department is equipped with lockers and with pruning and other tools for the use of students in laboratory work, which is made a leading feature in all the courses in pomology.

Elective Courses.

50. **I. PRACTICAL POMOLOGY.** — For juniors; seniors may elect. A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of nursery stock, pruning, culture of orchards, orchard fertilizers, cropping orchards, etc. Lectures, supplemented with text and reference books; field and laboratory exercises.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS and Mr. FRENCH.

Prerequisite, Horticulture 27.

51. **II. PRACTICAL POMOLOGY.** — For juniors; seniors may elect. As stated under Course 50.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS and Mr. FRENCH.

Prerequisite, Pomology 50.

52. **III. SMALL FRUITS.** — For juniors; seniors may elect. A study of the growing of small fruits, including raspberries, blackberries, strawberries, currants, gooseberries and grapes, dealing with such questions as their propagation, selecting a site for the plantation, soils, fertilizers, pruning, spraying, etc.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor SEARS and Mr. FRENCH.

Prerequisite, Pomology 51.

54. **II. SYSTEMATIC POMOLOGY.** — Seniors. A study of the varieties and nomenclature of the different fruits, with critical descriptions; special reference given to relationships and classification. Lectures, laboratory and field exercises.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DRAIN.

Prerequisite, Pomology 52.

75. **I. SYSTEMATIC POMOLOGY.** — Seniors. As stated under Course 54.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DRAIN.

Prerequisite, Pomology 54.

76. **II. ORCHARD MANAGEMENT.** — For seniors. Consideration will be given to the organization of a fruit farm to secure the most satisfactory distribution of income and of labor requirements. The costs of operations will be studied in connection with the keeping of orchard accounts and the estimation of supplies and equipment. The course will include a series of problems dealing with the application of principles learned in previous courses.

2 class hours.

1 2-hour laboratory period, credit, 3.

Professor VAN METER.

Prerequisite, Pomology 51.

77. **I. COMMERCIAL POMOLOGY.** — Seniors. The picking, handling, storing and marketing of fruits, including a discussion of storage houses, fruit packages, methods of grading and packing. Especial emphasis is placed upon laboratory and field work, where the student is given actual practice in the picking and packing of all the principal fruits.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Mr. RALEIGH.

Prerequisite, Pomology 51.

78. **III. SPRAYING.** — Seniors. A study of (a) spraying materials, their composition, manufacture and preparation for use; the desirable and objectionable qualities of each material, formulas used, cost, tests of purity. (b) Spraying machinery, including all the principal types of pumps, nozzles, hose and vehicles; their structure and care. (c) Orchard methods in the application of the various materials used, with the important considerations for spraying each fruit and for combating each orchard pest. This course is designed especially to familiarize the student with the practical details of actual spraying work in the orchard. Spray materials are prepared, spraying apparatus is examined and tested, old pumps are overhauled and repaired, and the actual spraying is done in the college orchards and small-fruit plantations.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DRAIN.

Prerequisite, Pomology 76.

79. **II. GENERAL POMOLOGY.** — For seniors; juniors may elect. Planned to meet the needs of students who cannot devote more than one term to the subject but who want a general knowledge of fruit growing. Consists of lectures and laboratory exercises on such topics as choosing the locations, kinds and varieties of fruits to grow, securing and setting the plants, care and cultivation, pruning, spraying, pests, harvesting and storing. Not offered in 1923-24.

2 class hours.

1 2-hour laboratory period, credit, 3.

Assistant Professor DRAIN.

80. **I. SEMINAR.** — For seniors majoring in pomology. Advanced study of problems relating to the business of fruit growing. Each student is assigned a major and

a minor problem in lines of work in which he is particularly interested. He pursues his studies both by reading and research, and the materials obtained will be worked into theses which are presented to the seminar for discussion. No lectures are given, but seminar meetings are held for one period each week.

Credit, 1.
The DEPARTMENT.

81. **II. SEMINAR.** — For seniors majoring in pomology. A continuation of Course 80. One seminar meeting each week.

Credit, 1.
The DEPARTMENT.

82. **III. SEMINAR.** — For seniors majoring in pomology. A continuation of Course 81. One seminar meeting each week.

Credit, 1.
The DEPARTMENT.

Vegetable Gardening.

Professor TOMPSON, Assistant Professor HARRIS, Mr. SNYDER.

The courses in Vegetable Gardening are designed for students who wish to enter commercial vegetable growing, the seed business, or professional work, such as teaching or experimental work. Each of these fields offer wide possibilities and the advancement of vegetable production will depend upon the number and quality of the men trained along these lines.

The department has ten acres of land, 3,800 sq. ft. of greenhouse space, and 150 hotbed sash, all of which are used to provide laboratory facilities. Part of this equipment is used for the non-commercial laboratory work, such as the students' gardens and the type and variety garden, while the remainder is devoted to commercial laboratory work.

In addition the department maintains at Lexington, Massachusetts, the Market Garden Field Station. Here the experimental and extension work of the department is carried on.

Elective Courses.

50. **III. GENERAL VEGETABLE GARDENING.** — Juniors; seniors may elect. A general course for those students who desire a general knowledge of agriculture, but do not care to spend the time for extreme specialization. Designed to teach the fundamentals of vegetable growing so they may be applied (1) to the growing of vegetables commercially as a cash crop with other types of agriculture, (2) to the growing of vegetables in the home garden, (3) to agricultural teaching in secondary schools, and (4) to professional agricultural work other than teaching.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Assistant Professor HARRIS.

52. **II. PRACTICAL VEGETABLE GARDENING.** — Juniors; seniors may elect. Courses 52 and 53 are designed for those students who wish to obtain a knowledge of vegetable growing in order that they may apply this to the successful commercial production of vegetables, or to become fitted for professional work such as teaching and research work. The course begins with a consideration of vegetables as a food, the part they play in the food supply of the city, state, or nation, and Massachusetts' part in this type of food production, followed by a study of the fundamentals of vegetable gardening. Deals with such questions as the selection of a location; soils, manures and fertilizers, green manures and cover crops; seeds and seeding; planting, tillage, irrigation; control of insects and diseases. Includes a detailed study of the cultural requirements of

the common vegetable crops, and the principles of rotation and double cropping. Text and reference books. Laboratory and field exercises.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisites, Horticulture 27, Agronomy 75.

53. **III. PRACTICAL VEGETABLE GARDENING.** — Juniors; seniors may elect. As stated under Course 52.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisite, Vegetable Gardening 52.

75. **I. TYPES AND VARIETIES.** — Seniors. Includes the systematic study of types, varieties and strains of the leading vegetable crops; exhibiting and judging of vegetables; determination of quality in vegetables; seed growing, variety improvement, roguing, seed harvesting, curing and storing.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisite, Vegetable Gardening 53 or 50.

76. **II. VEGETABLE FORCING.** — Seniors. A study of types, materials, construction, location, arrangement, capacity and cost of greenhouses for growing vegetables. A brief consideration of the heating plant, — the type, installation, piping and management; also the study of greenhouse vegetable crops and their production as practiced by commercial growers.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisite, Vegetable Gardening 53 or 50.

77. **III. COMMERCIAL VEGETABLE GROWING.** — Seniors. A consideration of vegetable growing as a business. A study of this specialized type of farming, including places where developed, types, extent, economic importance, capitalization, equipment and other fundamental problems of commercial vegetable gardening. Students assist in the planning and operation of a typical market-gardening area. Visits are made to market-gardening and truck-gardening farms.

3 class hours.

2 2-hour laboratory periods, credit, 5.
Assistant Professor HARRIS.

Prerequisite, Vegetable Gardening 53 or 50.

Drawing.

Required Courses.

25. **I. FREE-HAND DRAWING.** — For sophomores; juniors and seniors may elect. Lettering; free-hand perspective; sketching from type models, leaves, flowers and trees, houses, etc.; laying flat and graded washes in water colors; water-color rendering of leaves, flowers and trees; conventional coloring and map rendering in water colors; conventional signs and mapping in ink.

4 2-hour laboratory periods, credit, 8.

26. **II. MECHANICAL DRAWING.** — For sophomores; juniors and seniors may elect. Inking exercises; geometric problems; projection; intersections; isometric;

shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Students should have preparation in plane and solid geometry.

3 2-hour laboratory periods, credit, 3.

27. **III. MECHANICAL DRAWING.**—For sophomores; juniors and seniors may elect. As stated under Course 26.

3 2-hour laboratory periods, credit, 3.

Prerequisite, Drawing 26.

DIVISION OF SCIENCE.

Professor FERNALD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Botany.

Professor OSMUN, Assistant Professor CLARK, Assistant Professor McLAUGHLIN, Assistant Professor TORREY, Assistant Professor DAVIS.

A knowledge of the principles of plant life is fundamental in agricultural education. The required courses in botany are planned with this and the general educational value of the subject in view. Elective courses are of two types: (1) those which have for their chief aim the direct support of technical courses in agriculture and horticulture, and (2) those providing broader, more intensive training in the science. Courses in the second group may lead, when followed by postgraduate study, to specialization in the field. They also furnish excellent training for those specializing in other sciences and in scientific agriculture. In all undergraduate courses the relation of the science of botany to agriculture is emphasized.

The department occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. The building has two lecture rooms with seating capacity of 154 and 72, respectively; one seminar and herbarium room; large laboratories for general and special work; and smaller rooms for advanced students. A glass-enclosed laboratory for plant physiology adjoins the main building and provides unusual facilities for the study of phenomena of plant life. In addition, a greenhouse 28 by 70 feet is connected with the building. This is for experimental work in plant pathology and physiology, and for growing plants needed for instruction. The experiment station laboratories devoted to botanical research are in this building.

The laboratories and lecture rooms are of modern construction, finely lighted, and equipped with compound and dissecting microscopes, microtomes, paraffin and drying ovens, physiological and other apparatus, and a large collection of charts. The herbarium contains about 20,000 sheets of seed plants and ferns, 1,200 sheets of liverworts and mosses, and 25,000 specimens of fungi. Facilities and equipment for the study of plant physiology and pathology are excelled in few other institutions.

Required Courses.

3. **III. INTRODUCTORY BOTANY.**—Freshmen. Presents the seed plants as plastic organisms molded by their environment. Also introduces the student to methods of identifying and classifying plants.

An herbarium, illustrative of systematic, ecological and economic features, is started in the spring, but need not be presented until fall when credit is given in Course 25.

This makes it possible for the interested student to familiarize himself with the flora of the full growing season.

2 class hours.

2 2-hour laboratory periods, 4 study hours, credit, 10.

Assistant Professors TORREY and McLAUGHLIN.

25. **I. INTRODUCTORY BOTANY.**—Sophomores. The anatomy and physiology of the seed plants (Phanerogamia), with a brief summary of the lower forms of plant life. The herbarium started in connection with Botany 3 is presented as part of this course.

1 class hour.

2 2-hour laboratory periods, 2 study hours, credit, 7.

Assistant Professor TORREY.

Prerequisite, Botany 3.

Elective Courses.

26. **II. MORPHOLOGY AND TAXONOMY OF THE LOWER PLANTS (CRYPTOGAMIA).**—Sophomores. Systematic study of typical forms of bacteria, algæ, fungi, lichens, mosses, ferns. (Courses 3, 25 and 26 constitute a general elementary course in botany, and are required of all students who major in the subject.)

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors OSMUN and TORREY.

Prerequisite, Botany 25.

27. **III. THE VASCULAR PLANTS.**—For sophomores; juniors and seniors may elect. Continues the work of Botany 26, but deals with the higher plants, such as ferns and fernworts, gymnosperms and angiosperms. The department possesses a unique collection of lantern slides and microscopical preparations for use in this course.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor TORREY.

Prerequisite, Botany 26.

50. **I. DISEASES OF CROPS.**—For juniors; seniors may elect. The lectures are general and are taken by all who elect the course, but in order to permit students to specialize on the diseases of crops most closely related to their majors or in which they are most interested, the course is divided for laboratory work into the following sections: (I) diseases of truck and field crops; (II) diseases of floricultural crops and ornamentals; (III) diseases of fruit crops; (IV) diseases of shade and forest trees. One, two or three laboratory sections may be taken.

1 class hour.

1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Assistant Professor McLAUGHLIN.

Prerequisites, Botany 3 and 25.

51. **II. DISEASES OF CROPS.**—For juniors; seniors may elect. As stated under Course 50.

1 class hour.

1, 2 or 3 2-hour laboratory periods, credits, 2, 3 or 4.

Assistant Professor McLAUGHLIN.

Prerequisite, Botany 50.

52. **I. SYSTEMATIC MYCOLOGY.**—For juniors; seniors may elect. Morphology and development of typical species representing the orders and families of fungi; practice in identification, collection and preservation of fungi; study of systems of classification; collateral reading. A prerequisite of the senior course in plant pathology, but open to all.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DAVIS.

Prerequisite, Botany 26.

53. **II. SYSTEMATIC MYCOLOGY.**—For juniors; seniors may elect. As stated under Course 52.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DAVIS.

Prerequisite, Botany 52.

54. **III. SYSTEMATIC MYCOLOGY.**—For juniors; seniors may elect. As stated under Course 52.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor DAVIS.

Prerequisite, Botany 53.

55. **I. PLANT HISTOLOGY.**—For juniors; seniors may elect. Comparative study of the tissues of plants; training in histological methods, including the use of precision microtomes, methods of killing, fixing, sectioning, staining and mounting; collateral reading and conferences. This course offers valuable training in preparation for further work in botany.

3 2-hour laboratory periods, credit, 3.

Professors OSMUN and McLAUGHLIN.

Prerequisites, Botany 3 and 25.

56. **II. PLANT HISTOLOGY.**—For juniors; seniors may elect. As stated under Course 55.

3 2-hour laboratory periods, credit, 3.

Professors OSMUN and McLAUGHLIN.

Prerequisite, Botany 55.

58. **I. SYSTEMATIC BOTANY OF THE HIGHER PLANTS.**—For juniors; seniors may elect. An intensive study of gymnosperms and angiosperms. Lectures deal with the interrelations of the flowering plants and with their ecology, distribution and economic importance. Laboratory work consists of a critical study of types from the most important natural plant families. Particular emphasis is laid on the flora of Massachusetts. The department herbarium and greenhouses supply material of important tropical forms for study.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Assistant Professor TORREY.

59. **II.** For juniors; seniors may elect. As stated under Course 58.

2 class hours.

2 2-hour laboratory periods, credit, 4.

Assistant Professor TORREY.

75. **I. PLANT PATHOLOGY.**—Seniors. Comprehensive study of diseases of plants; training in laboratory methods and technique, including culture work and artificial inoculation of hosts; miscellaneous diagnosis; study of literature and representative life histories of pathogens. Prepares for civil service, experiment station and college work.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Professors OSMUN and DAVIS.

Prerequisite, Botany 54.

76. **II. PLANT PATHOLOGY.**—Seniors. As stated under Course 75.

1 class hour.

4 2-hour laboratory periods, credit, 5.

Professors OSMUN and DAVIS.

Prerequisite, Botany 75.

77. **III. PLANT PATHOLOGY.** — Seniors. As stated under Course 75.
 1 class hour. 4 2-hour laboratory periods, credit, 5.
 Professors OSMUN and DAVIS.

Prerequisite, Botany 76.

78. **I. PLANT PHYSIOLOGY.** — Seniors. Study of the factors and conditions of
 (a) Plant Nutrition, including the taking up of water and mineral substances, the assimilation of carbon and nitrogen, and the release of energy due to the processes of dissimilation; (b) Plant Growth, including the influence of internal and external factors on growth, the development of reproductive and vegetative organs, and touching on plant inheritance and the origin of new varieties; (c) Plant Movements, including those due to the taking up of water, and those movements of both motile and fixed forms in response to external stimuli. Special emphasis is laid on the development of skill in the manipulation of apparatus in the laboratory; weekly conferences are held at which students report on assignments.
 2 class hours. 3 2-hour laboratory periods, credit, 5.
 Assistant Professor CLARK.

Prerequisites, Botany 26 and Chemistry 51.

79. **II. PLANT PHYSIOLOGY.** — Seniors. As stated under Course 78.
 2 class hours. 3 2-hour laboratory periods, credit, 5.
 Assistant Professor CLARK.

Prerequisite, Botany 78.

80. **III. PLANT PHYSIOLOGY.** — Seniors. As stated under Course 78.
 2 class hours. 3 2-hour laboratory periods, credit, 5.
 Assistant Professor CLARK.

Prerequisite, Botany 79.

82. **II. CYTOLOGY AND EMBRYOLOGY.** — Seniors. Morphology and physiology of the cell; cell-division; embryonal development.
 3 2-hour laboratory periods, credit, 3.
 Assistant Professor McLAUGHLIN.

Prerequisites, Botany 26 and 55.

83. **III. CYTOLOGY AND EMBRYOLOGY.** — Seniors. As stated under Course 82.
 3 2-hour laboratory periods, credit, 3.
 Assistant Professor McLAUGHLIN.

Prerequisite, Botany 82.

86. **I.** 87. **II.** 88. **III. SEMINAR.** — For seniors and graduate students. Presentation and discussion of important current botanical papers. A major requirement.
 1 class hour. Credit, 1.

The DEPARTMENT.

General and Agricultural Chemistry.

Professor LINDSEY, Professor CHAMBERLAIN, Professor PETERS, Assistant Professor SEREX, Assistant Professor JULIAN.

In teaching the courses in chemistry, emphasis is laid on both their educational and their vocational value. The courses in the freshman year deal with fundamental principles, and give the student such an understanding of the subject as will enable him to apply it in farm practice. The more advanced courses, including quantitative analysis and organic, physiological and physical chemistry, are for those who intend to become teachers and workers in the allied sciences, or who desire to follow agricultural chemistry as a vocation. Advanced training is given by means of postgraduate courses (see Graduate School).

Those completing the undergraduate courses are fitted for positions in the agricultural industries, — fertilizer, feed and insecticide manufacture, — as well as in other lines of industry, and in the State experiment stations and in commercial laboratories. Postgraduate students are prepared for positions as teachers in high schools and colleges, and for more advanced positions in industry and in the experiment stations.

The laboratory, which for many years was used for the work of the Department of Chemistry, was burned early in September, 1922. A new laboratory, to cost \$300,000, is under construction and will be ready for occupancy about Jan. 1, 1924. The plans for the new building have been developed with the utmost care, and will provide a building amply suited for the adequate instruction of students in this subject.

Required Courses.

The freshman work consists of two distinct parts: Courses 1 and 2 contain more hours and are for those who have had no chemistry in the secondary schools, and Courses 4 and 5 are for those who have presented chemistry for entrance. Both groups of courses bring the student out at the same point. It is obviously to the advantage of the student to take a course in chemistry in high school and thus obviate the extra hours of Courses 1 and 2 in the freshman year.

1. **I. GENERAL CHEMISTRY.** — Freshmen. This course is for those students who do not present chemistry for entrance and who begin the subject in college. An introduction to the fundamental chemical laws, together with a study of the common acid-forming elements and their compounds.

3 class hours.

2 2-hour laboratory periods, 5 study hours, credit, 12.

Professor PETERS.

2. **II. AGRICULTURAL CHEMISTRY.** — Freshmen. The preparation of a number of substances important in agriculture, such as superphosphate, ammonium sulfate, muriate and sulfate of potash, Paris green, arsenate of lead, Bordeaux mixture, lime-sulfur and emulsions. These materials are prepared in the laboratory and studied in detail in the classroom; some of the substances prepared may be analyzed. Particular attention will be given to a study of the composition, properties and reactions of soils. Approximate quantitative determinations of a number of constituents of soils and fertilizers will be made.

3 class hours.

2 2-hour laboratory periods, 5 study hours, credit, 12.

Professor PETERS.

4. **I. ADVANCED GENERAL CHEMISTRY.** — Freshmen. A review of the fundamental chemical laws, together with the common acid and base-forming elements and their compounds. Textbook, Kahlenberg's "Outlines of Chemistry." The laboratory work takes the synthetic form. Substances of agricultural importance are prepared in quantity and studied in detail by the student. These include ammonium sulfate, superphosphate, muriate and sulfate of potash, arsenate of lead, Paris green, Bordeaux mixture, lime-sulfur and emulsions.

2 class hours.

2 2-hour laboratory periods, 4 study hours, credit, 10.

Assistant Professor SEREX.

Prerequisite, Entrance Chemistry.

5. **II. INORGANIC AGRICULTURAL CHEMISTRY.** — Freshmen. A study of the chemical composition, properties and reactions of soils, fertilizers, fungicides and insecticides. The laboratory work is divided into three parts: (a) qualitative examination of soil, plant ash and superphosphate; (b) approximate quantitative determination of

moisture, ash, carbonic acid, phosphoric acid, potash, etc.; (c) special work on retention of salts by soil, leaching of lime from the soil by carbonated water, etc.

2 class hours.

2 2-hour laboratory periods, 3 study hours, credit, 9.

Assistant Professor SEREX.

Elective Courses.

25. **I. QUALITATIVE ANALYSIS.** — *Basic.* — Sophomores. The systematic analysis of metallic salts, presented from the ionic viewpoint. A close study of the tests used in the separation and identification of the metals; he then applies these tests to unknown mixtures. Text, Medicus' "Qualitative Analysis," with Stieglitz's "Qualitative Analysis" and Gooch & Browning's "Qualitative Analysis" for reference. This course should be taken by all intending to follow chemistry as a vocation.

1 class hour.

2 2-hour laboratory periods, 4 study hours, credit, 9.

Assistant Professor SEREX.

Prerequisite, Chemistry 2 or 5.

26. **II. QUALITATIVE ANALYSIS.** — *Acidic.* — Sophomores. A continuation of Course 25.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Assistant Professor SEREX.

27. **III. QUANTITATIVE ANALYSIS.** — For sophomores; juniors and seniors may elect. Includes the gravimetric and volumetric determinations of some of the commoner metals and non-metals. Talbot's "Quantitative Chemical Analysis" is used as a text.

1 class hour.

2 4-hour laboratory periods, credit, 5.

Professor PETERS.

Prerequisite, Chemistry 25. Course 26 is prerequisite for those majoring in chemistry.

30. **III. ORGANIC AGRICULTURAL CHEMISTRY.** — Elective for sophomores, juniors and seniors who have not taken Course 6. Embraces the study of the most important groups of organic compounds of plants and animals, the composition of plants, the chemistry of plant growth, plants as food and as industrial material, the composition of animals, the chemistry of digestion, also the study of some of the products related to plants and animals, such as milk, butter, cheese, sugar and alcohol. The treatment of the subject is general, avoiding (so far as possible) complicated chemical facts and relationships, and endeavoring simply to make the student acquainted with the general chemistry of plants and animals and agricultural processes and products.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor CHAMBERLAIN.

51. **I. ORGANIC CHEMISTRY.** — For juniors; seniors may elect. Consists of a systematic study, both from texts and in the laboratory, of the more important compounds in the entire field of organic chemistry. Especial attention is given to those compounds which are found in agricultural products or are manufactured from them. These include alcohols, acids, esters, fats, carbohydrates and proteins. The work forms a foundation for courses in physiological chemistry and agricultural analysis, and is especially planned for those majoring in chemistry or the other sciences. Those electing Course 51 are expected to elect Course 52.

5 class hours.

2 3-hour laboratory periods, credit, 8.

Professor CHAMBERLAIN.

Prerequisites, Chemistry 2 or 5, and Chemistry 27 for those majoring in chemistry.

52. **II. ORGANIC CHEMISTRY.** — For juniors; seniors may elect. A continuation of Course 51, dealing principally with compounds of the benzene series.
5 class hours. 2 3-hour laboratory periods, credit, 8.
Professor CHAMBERLAIN.

62. **III. ADVANCED QUANTITATIVE ANALYSIS.** — For juniors; seniors may elect. Advanced work on subjects as stated under Course 27, together with the analysis of insecticides or the analysis of soils and fertilizers.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor PETERS.

Prerequisite, Chemistry 27.

65. **III. PHYSICAL CHEMISTRY.** — For juniors; seniors may elect. A résumé of general chemistry from the viewpoint of physical chemistry, and the application of physical chemistry to agricultural chemistry.
3 class hours. 1 4-hour laboratory period, credit, 5.
Assistant Professor SEREX.

Prerequisite, Chemistry 27.

76. **I. MILK AND BUTTER ANALYSIS.** — For seniors; juniors may elect. A study of milk and butter analytically.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor PETERS.

Prerequisite, Chemistry 27.

77. **II. CATTLE FEED, WATER AND MISCELLANEOUS ANALYSIS.** — For seniors; juniors may elect. The analysis of cattle feeds and water, with interpretations. Other materials may be analyzed.
1 class hour. 2 4-hour laboratory periods, credit, 5.
Professor PETERS.

Prerequisite, Chemistry 27.

80. **I. PHYSIOLOGICAL CHEMISTRY.** — Seniors. Supplementary to Courses 51 and 52. To those who expect to take up scientific work in microbiology, botany, agronomy, animal husbandry, etc., and who have had Courses 51 and 52, it gives acquaintance with the chemistry of the physiological processes in plants and animals, by means of which some of the important organic compounds studied in Courses 51 and 52 are built up in the living organism or are used as food by it. In the lectures the study of food and nutrition as related to both human and domestic animals is the principal subject. In the laboratory experimental studies are made of the animal body and the processes and products of digestion, secretion and excretion.
3 class hours. 2 2-hour laboratory periods, credit, 5.
Professor CHAMBERLAIN.

86. **II. REVIEW OF GENERAL CHEMISTRY.** — Seniors. Primarily for students majoring in chemistry; others may elect by permission from the instructor. A knowledge of physical chemistry is desirable. The review of general chemistry is largely theoretical, using Alexander Smith's "Introduction to Inorganic Chemistry" as text.
3 class hours. Credit, 3.
Professor PETERS.

87. **III. HISTORY OF CHEMISTRY.** — Seniors. An historical and biographical study of chemistry and chemists. The aim of the course is: (1) to give the student a comprehensive view of the science as a whole, through a study of the development of new ideas and the establishment of new theories and laws; and (2) to arouse an enthusiastic interest in the subject and an appreciation of the true spirit of scientific

research through a sympathetic presentation of the work and lives of the great chemists who have been the creators of the chemistry of to-day. The course will consist of lectures, supplemented by systematic correlated reading, and the preparation of reports or essays.

3 class hours.

Credit, 3.

Professor CHAMBERLAIN.

91. **III. SPECIAL WORK IN AGRICULTURAL CHEMICAL ANALYSIS.** — Seniors. The student is given a problem to solve either in analytical chemistry or related to the agricultural industries. This is to acquaint him with the methods used in research and with the literature, and show him how to handle problems in this field of chemistry when occasion arises.

10 laboratory hours, credit, 5.

Professor PETERS.

92. **II. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY.** — Seniors. In this course, as in Courses 91 to 95, the student may give his attention primarily to one line of chemical study. To those whose tastes and interests are in connection with the organic and physiological problems of agricultural chemistry, many subjects of study present themselves, among which may be mentioned: proteins, carbohydrates, fats, organic nitrogenous compounds in fertilizers and soils and their relation to plants, the commercial production of alcohol from agricultural products, dyes, digestion and dietary studies, the chemical study of dairy products, etc.

6 or 10 laboratory hours, credit, 3 or 5.

Professor CHAMBERLAIN.

Prerequisites, Chemistry 51, 52 and 80.

93. **III. SPECIAL WORK IN PHYSIOLOGICAL AND ORGANIC AGRICULTURAL CHEMISTRY.** — Seniors. As stated under Course 92.

10 laboratory hours, credit, 5.

Professor CHAMBERLAIN.

Prerequisite, Chemistry 92.

94. **II. SPECIAL WORK IN PHYSICAL CHEMISTRY.** — Seniors. The field of agricultural chemistry offers many problems that have been attacked through the methods of physical chemistry; such, for example, are the hydrolysis of salts and of minerals and the absorption of salts and fertilizers by soils. Each student selects one line of work and follows it through the course, repeating some of the original work.

6 or 10 laboratory hours, credit, 3 or 5.

Assistant Professor SEREX.

Prerequisite, Chemistry 65.

95. **III. SPECIAL WORK IN PHYSICAL CHEMISTRY.** — Seniors. As stated under Course 94.

10 laboratory hours, credit, 5.

Assistant Professor SEREX.

Prerequisite, Chemistry 94.

Entomology.

Professor FERNALD, Professor CRAMPTON, Assistant Professor ALEXANDER, Assistant Professor CASSIDY.

The introductory Courses 26 and 27, taken together, present a comprehensive view of the relation of insects to man, particularly as crop pests. The most important pests are carefully studied, together with the methods for their control. Courses 50 and 51 are arranged for special study of the pests of any one line of agricultural or horticultural

occupation, selected by the student according to his plan of future work, with the intent of making him thoroughly familiar with the pests he will meet in his selected work after graduation, and the means of controlling them. The remaining courses are for the training of men as State or experiment station entomologists; for those going into the care of trees, etc., on estates, or for cities and towns; and as entomological experts, for which the demand has been very large.

Fernald Hall provides excellent lecture rooms and laboratories for this department. The laboratories are provided with individual desks, equipped with microscopes and all needed apparatus of all kinds. Dissecting microscopes, binoculars, microtomes, photographic apparatus, glassware and reagents are available for use and electric light and gas are connected with each desk. Two laboratories, one for juniors and seniors, the other for graduate students, are thus equipped. A department library containing all the more important works on insects, supplemented by others on the subject in the main library, and by the private libraries of the professors, make available more than 25,000 books and pamphlets on this subject. In addition, all the current magazines are received and their files are accessible to every one. A card catalogue giving references to the published articles on different insects contains about 65,000 cards, and is probably the largest index of its kind in the world. Spray pumps, nozzles and spraying appliances of all kinds are in use in various parts of the courses, and a large collection of insecticides is accessible for study. Photographic rooms are specially prepared for the photography of insects, and the greenhouses, gardens, orchards and the grounds of the college provide wide opportunities for the study, under natural conditions, of insect pests.

Elective Courses.

26. **II. GENERAL AND ECONOMIC ENTOMOLOGY.** — For sophomores; juniors and seniors may elect. For students who desire some knowledge of insects, but who cannot give more than two terms to the subject. Also serves as an introduction to the later courses for those who intend to follow entomology farther. Touches briefly upon the structure of insects so far as this is needed for such a course; deals with metamorphosis, classification to the larger groups, and discusses the most important methods and materials used for control. The greater part of the time is devoted to special study of the most important insect pests, particularly of New England, showing their modes of life, the injuries they cause, and the best methods of control. In this way the most serious pests of fruit trees, ornamental trees and shrubs, market-garden and greenhouse pests, those attacking field crops and those affecting animals and man, are treated. Lectures and recitations. Students taking this course may choose between Courses 27, **III** and 28, **III**.

3 class hours.

Credit, 3.

Professor FERNALD.

27. **III. GENERAL AND ECONOMIC ENTOMOLOGY.** — A continuation of Course 26. Lectures and recitations, completing the subject.

2 class hours.

Credit, 2.

Professor FERNALD.

Prerequisite, Entomology 26.

28. **III. ECONOMIC ENTOMOLOGY.** — A continuation of Course 26, with field work from about May 1; lectures and recitations till about May 1; two-hour field periods thereafter. In the field the work of insects will be studied and collections of insects made. Methods of collecting, mounting and preparing insects for collections will be taught. Class limited to 30 members.

2 class hours till about May 1; thereafter 2 2-hour field periods.

Credit, 2.

Professors FERNALD, CRAMPTON, ALEXANDER.

Prerequisite, Entomology 26.

50. **I. PESTS OF SPECIAL CROPS.** — For juniors; seniors may elect. For students not majoring in entomology. The laboratory work is largely individual in this term. Accordingly, students majoring in subjects other than entomology, but who desire a more complete knowledge of the insects connected with their own major line of work, can obtain it here. A student majoring in floriculture, for example, will devote his laboratory time to a careful study of the insects injuring floricultural crops, learning how to recognize them and their work in their different stages, and the best methods for their control. Courses of this kind are available on the insects attacking field crops, market-garden crops, tree fruits, small fruits, shade trees and shrubs, flowers, forest trees, the domesticated animals, household pests and man. This work may be continued in the winter term also. (See Course 51, **II.**)

3 2-hour laboratory periods, credit, 3.
Professor FERNALD.

Prerequisites, Entomology 26 and 27 or 28.

51. **II. PESTS OF SPECIAL CROPS.** — As stated in Course 50, **I.** For students not majoring in entomology. Those who were not able to take Entomology 50 in the fall may take it here. Those who took Entomology 50 in the fall have an opportunity to continue the work during this term also.

3 2-hour laboratory periods, credit, 3.
Professor FERNALD.

52. **II. INSECTICIDES AND THEIR APPLICATION. CLASSIFICATION OF INSECTS.** — For juniors majoring in entomology. Lectures on the composition, preparation and methods of application of insecticides. Laboratory work on classification of insects, particularly those for which insecticides are used.
1 class hour.

2 2-hour laboratory periods, credit, 3.
Professors FERNALD and ALEXANDER.

Prerequisite, Entomology 53.

53. **I. INSECT MORPHOLOGY.** — For juniors majoring in entomology. The lectures treat of the external and internal anatomy of insects, particularly of those characters used in identification, a knowledge of which is needed in the accompanying laboratory work. In the laboratory the external anatomy of the most important groups is studied, followed by the identification of insects of these groups, to show how the characters are made use of in learning the names of insects, and to teach the use of analytical keys.
2 class hours.

3 2-hour laboratory periods, credit, 5.
Professor CRAMPTON.

Prerequisites, Entomology 26 and 27 or 28.

54. **I. INSECT CLASSIFICATION.** — For juniors majoring in entomology. Systematic identification of insects of various groups. Study of various entomological publications and methods of finding the literature on any insect.

3 2-hour laboratory periods, credit, 3.
Assistant Professor ALEXANDER.

Prerequisite, Entomology 53.

56. **II. PESTS OF SPECIAL CROPS.** — For juniors majoring in entomology. Individual laboratory work on the most important insect pests of this country, and the preparation and presentation of bulletin material on them.

3 2-hour laboratory periods, credit, 3.
Professor FERNALD.

55. **III. ECONOMIC ENTOMOLOGY.** — For juniors majoring in entomology. Continuation of lectures on insecticides; laboratory work on the identification of insect pests, the relations of insects to disease.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professors FERNALD, CRAMPTON and ALEXANDER.

Prerequisites, Entomology 52 and 53.

75. **III. FOREST AND SHADE-TREE INSECTS.** — For juniors; seniors may elect. The lecture work deals with the principles and methods of controlling insects which attack forests and forest products, shade trees, etc. The laboratory periods are devoted to a study of the more important species, their identification, biology and specific control measures. Field work supplements laboratory study if time permits.

1 class hour.

3 2-hour laboratory or field periods, credit, 4.

Assistant Professor ALEXANDER.

Prerequisites, Entomology 26 and 27 or 28; 53 and 54 desirable.

76. **I. ADVANCED ENTOMOLOGY.** — For seniors. Studies on insect bionomics; scale insects, their structure, habits, methods of mounting, identification, etc.; studies of the animals not insects with which entomologists are expected to deal.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professors CRAMPTON and ALEXANDER.

Prerequisite, Entomology 55.

77. **II. ADVANCED ENTOMOLOGY.** — Studies of the life history, habits and methods of control of the important insect pests of the United States; recognition tests of these pests and an examination of the literature on them; methods of bulletin preparation.

3 2-hour laboratory periods, credit, 3.

Assistant Professor ALEXANDER.

Prerequisite, Entomology 76.

78. **III. ADVANCED ENTOMOLOGY.** — Classification of insects and of their early stages; principles of classification, the use of literature on entomology and the preparation of bibliographies and indices; the enemies of insects.

1 class hour.

3 2-hour laboratory or field periods, credit, 4.

Professors FERNALD, CRAMPTON and ALEXANDER.

Prerequisite, Entomology 77.

90. **II. EVOLUTION.** — For juniors; seniors may elect. In order to demonstrate the universal scope and operation of the laws of evolution, the course includes a brief sketch of the probable origin and evolution of matter as viewed in the light of modern physical and chemical research; the evolution of the solar system, leading to the formation of the earth; the changes in the earth, preparatory to the production of life; the physical and chemical basis of life; the probable steps in the formation of living matter, and the theories concerning it; the evolution of living things; the developmental history of man, and of the races of mankind, the evolution of human intelligence, languages, culture, institutions, etc., and man's probable future in the light of his past development. Especial consideration is given to the factors of evolution, the basic principles of heredity, sex-determination, variation and similar topics, with particular reference to their application to human welfare; and the recent contributions in the field of entomology to the advancement of our knowledge of these fundamental principles are briefly reviewed.

3 class hours.

Credit, 3.

Professor CRAMPTON.

Courses in Beekeeping.

65. **III. INTRODUCTORY BEEKEEPING.** — For juniors. A detailed study of the normal behavior of the honey bee and the colony as a whole, followed by a study of such practical work of the apiary as is carried on in spring and summer. In so far as possible the laboratory work parallels the lecture work, and both are made to follow the seasonal processes of the colony. Spring management, swarm control and the production and care of the honey crop are covered thoroughly. The course is designed to meet the needs of the horticulturist as well as those of the honey producer, and should be followed by Course 85, I.

1 class hour.

2 2-hour laboratory periods, credit, 3.
Assistant Professor CASSIDY.

85. **I. INTRODUCTORY BEEKEEPING.** — For seniors. A continuation of Course 65 and a completion of the beekeeping year. Fall management, preparation for winter and wintering are studied in detail in lectures and laboratory work. It is highly advisable for those taking Course 65 to take Course 85, and thus complete the annual cycle of beekeeping activity.

2 class hours.

1 2-hour laboratory period, credit, 3.
Assistant Professor CASSIDY.

86. **II. ADVANCED BEEKEEPING.** — For seniors. A study of the special problems with which the beekeeper deals. The diagnosis and control of the various bee diseases, production of wax, sources of nectar, honey, bee anatomy and physiology, and marketing of the crop are some of the principal topics discussed. The course is designed for those who intend going into honey production either as a principal occupation or as a side line.

2 class hours.

1 2-hour laboratory period, credit, 3.
Assistant Professor CASSIDY.

Mathematics and Civil Engineering.

Professor OSTRANDER, Professor MACHMER, Assistant Professor MOORE, Mr. PORTER.

The work of the freshman year is required. It is intended to furnish the necessary drill and groundwork needed for many of the scientific and practical courses of other departments. Thoroughness and accuracy are insisted upon. The advanced work in mathematics is taught from a practical standpoint, and many of its applications to other subjects are given. The courses in surveying and civil engineering are given to furnish the groundwork for a professional career. Special emphasis is given to the subjects bearing on highway construction and maintenance.

For drawing, a room on the north side is used for the draughting. It has draughting tables, T squares, scales, etc., for twenty students. Vernier protractors, parallel rules and steel T squares are available for precise work. A small room is devoted to blue printing.

In surveying, the department has a considerable number of chains and tapes, two railroad compasses, a builder's level, two dumpy levels, two Y levels and two old levels used for teaching the adjustments. Six transits are available for student use. Two are provided with solar attachments. An omnimeter with vernier reading to ten seconds is available for geodetic work. A hand level, mining aneroid barometer, and prismatic compass are provided for reconnaissance work. A set of Gilmore's needles and a Fairbanks' machine are used for cement testing.

Required Courses.

1. **I. HIGHER ALGEBRA.** — Freshmen. A brief review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Reitz and Craithorne's "College Algebra."

4 class hours, 6 study hours.

Credit, 10.

Professors MACHMER, MOORE and Mr. PORTER.

2. **II. HIGHER ALGEBRA.** — As stated under Course 1. Required of all who present solid geometry for entrance.

3 class hours, 4 study hours.

Credit, 7.

Professors MACHMER, MOORE and Mr. PORTER.

3. **II. SOLID GEOMETRY.** — Freshmen. Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical triangles and the measurement of surfaces and solids. Wentworth and Smith's "Solid Geometry." Required unless accepted for admission.

3 class hours, 4 study hours.

Credit, 7.

Professors MACHMER, MOORE and Mr. PORTER.

4. **II. MENSURATION AND COMPUTATION.** — Freshmen. A review of methods of computation, with special emphasis on short and abbreviated processes, together with methods of checking computations and of forming close approximations; use of slide rule. Also the graph, mensuration of plane and solid figures, weights and measures and elementary mechanism. Numerous practical problems are selected from such subjects as the following: the mathematics of woodworking; rough lumber; general construction; forestry methods in heights of trees; pulleys, belts and speeds; power and its transmission; dairying; agronomy; computation of areas from simple measurements.

2 class hours, 3 study hours.

Credit, 5.

Professor MACHMER and Mr. PORTER.

5. **III. PLANE TRIGONOMETRY.** — Freshmen. The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry."

3 class hours, 6 study hours.

Credit, 9.

Professors MACHMER, MOORE and Mr. PORTER.

Elective Courses.

26. **II. PLANE SURVEYING.** — For sophomores; juniors and seniors may elect. The elements of the subject, including the adjustment and use of the usual instruments. Textbook and lectures.

2 class hours.

Credit, 2.

Professors OSTRANDER and MOORE.

27. **III. PLANE SURVEYING.** — For sophomores; juniors and seniors may elect. As stated under Course 26. Includes field work.

3 2-hour laboratory periods, credit, 3.

Professors OSTRANDER and MOORE.

Prerequisite, Mathematics 26.

50. **I. ANALYTIC GEOMETRY.** — For juniors; seniors may elect. A discussion of the geometry of the line, the circle, conic sections, and the higher plane curves. Fine and Thompson's "Co-ordinate Geometry."
3 class hours.

Credit, 3.

Professor MACHMER.

Prerequisites, Mathematics 1, 2, 3 and 5.

51. **II. DIFFERENTIAL AND INTEGRAL CALCULUS.** — For juniors; seniors may elect. A first course in the subject, with some of the more important applications. Granville's "Differential and Integral Calculus."
5 class hours.

Credit, 5.

Assistant Professor MOORE.

Prerequisites, Mathematics 1, 2, 3 and 5.

52. **III. INTEGRAL CALCULUS.** — For juniors; seniors may elect. A continuation of Course 51.
5 class hours.

Credit, 5.

Assistant Professor MOORE.

Prerequisite, Mathematics 51.

53. **II. ELEMENTARY STRUCTURES.** — For juniors; seniors may elect. An elementary course in roofs and bridges. Textbook and lectures.
3 class hours.

1 2-hour laboratory period, credit, 4.

Professor OSTRANDER.

75. **I. HYDRAULICS AND SANITARY ENGINEERING.** — For seniors; juniors may elect. Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Textbook and lectures.
5 class hours.

Credit, 5.

Professor OSTRANDER.

76. **I. MATERIALS OF CONSTRUCTION, FOUNDATIONS AND MASONRY CONSTRUCTION.** — For seniors; juniors may elect. Textbook and lectures.
4 class hours.

1 2-hour laboratory period, credit, 5.

Professor OSTRANDER.

77. **II. ROADS AND RAILROADS.** — For seniors; juniors may elect. Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Textbook and lectures.
3 class hours.

Credit, 3.

Professor OSTRANDER.

78. **III. ROADS AND RAILROADS.** — For seniors; juniors may elect. As stated under Course 77.

3 2-hour laboratory periods, credit, 3.

Professor OSTRANDER.

Prerequisite, Mathematics 77.

Microbiology.

Professor MARSHALL, Assistant Professor ITANO, Mr. AVERY, Miss GARVEY.

Three objectives are sought in the arrangement of the courses following: (1) Introductory courses (50 and 51) needed in the general training of every college student. (2) An introductory course followed by a specific course (as 80, 81, 82, 83), necessary to every student engaged in the Division of Agriculture, with which the specific course deals. (3) Introductory courses (50 and 51) followed by Courses 52, 75, 76 and 81, preparatory for students who are aiming to specialize in agricultural microbiology.

(Courses 75, 76 and 81 are adapted to those having Courses 50 and 51 only, and are also adapted to those majoring in microbiology.)

The microbiological work is carried on in a building especially designed for it. There are 4 class laboratory rooms, 8 private laboratory rooms, 1 lecture room, 5 incubator rooms, 3 sterilizing rooms, 3 hood rooms, 3 washing rooms, 3 inoculating rooms, 3 weighing rooms, an animal room, a photographic and a dark room, a sub-basement refrigerator room, a library and 4 office rooms.

The class laboratory rooms are so arranged that individual desks are available for student use. Hot and cold water and gas connections are convenient for each desk; high-pressure steam and electric connections are also available. The building is well lighted and of sanitary construction; all the walls are of brick, and the building is fireproof.

The library is equipped with such books and current periodicals as are useful in the conduct of bacteriological work and investigations. Twenty-four scientific magazines are available regularly.

There are incubators, both electric and gas, hot-air sterilizers, ordinary steam sterilizers, autoclaves, an inspissator, blood-testing apparatus, vacuum apparatus, air-pressure apparatus, shaker, grinder, centrifugal machines, a water still of 5 gallons per hour capacity, Hoskins' combustion furnace, a balopticon, complete microphotographic equipment, microscopes, microtome, and such other apparatus, glassware and chemicals as are needed for extensive and intensive work.

25. **I. PERSONAL HYGIENE.** — For sophomores. Such subjects as the hygiene of the mouth and teeth, the gastro-intestinal tract, food, the skin, respiration apparatus, ear, eye and nervous system are reviewed. The value of bathing, clothing, physical exercise, etc., are considered. Attention is given to emergencies, accidents of "first aid," and such other matters as usually fall within this category. Not offered in 1923-24. 2 class hours.

Credit, 2.

Professor MARSHALL and Miss GARVEY.

26. **II.** For sophomore men. An extension of Course 25. 2 class hours.

Credit, 2.

Professor MARSHALL and Miss GARVEY.

In place of Military 26; winter term, sophomores.

27. **III. SANITARY SCIENCE.** — For sophomores. The usual topics of sanitary science, as ventilation, heating, plumbing, water supply, sewage disposal, food control and communicable diseases, are treated from the standpoint of individual and public health control.

2 class hours.

Credit, 2.

Professor MARSHALL and Miss GARVEY.

In place of Military 27; spring term, sophomores.

Elective Courses.

50. **I, II and III. INTRODUCTORY AND GENERAL MICROBIOLOGY.** — For juniors; seniors may elect. Aims to provide elementary basis for microbial studies and interpretation, to enable students to pursue special pertinent courses which will serve as supports in practical electives or majors, and to furnish students with such material as will be valuable in understanding public health problems.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Professor MARSHALL and Mr. AVERY.

51. **II and III. MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY.** — For juniors; seniors may elect. Types of micro-organisms, technic of handling,

methods of culture and functions of micro-organisms are considered. This course is fundamental to all advanced and extended microbiological studies.

10 laboratory hours, credit, 5.

Mr. AVERY.

Prerequisite, Microbiology 50.

52. **III. ADVANCED MORPHOLOGICAL, CULTURAL AND PHYSIOLOGICAL MICROBIOLOGY.** — For juniors; seniors may elect. Prepares for a more intimate knowledge of microbiological agricultural problems. To accomplish this object it is necessary to provide more advanced technique and methods of culture, together with a more extensive knowledge of micro-organisms and their functions.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisites, Microbiology 50 and 51.

75. **II. AGRICULTURAL MICROBIOLOGY.** — For seniors; juniors may elect. This general comprehensive course is designed to cover in an elementary manner those subjects only which confront the student of general agriculture, — the microbiological features of air, water, sewage, soil, dairy, fermentations, food, vaccines, antisera, microbial plant infections, methods and channels of infections, immunity and susceptibility, microbial infections of man and animals, methods of control or sanitary and hygienic practices.

10 laboratory hours, credit, 5.

Mr. AVERY.

Prerequisites, Microbiology 50 and 51.

76. **III. AGRICULTURAL MICROBIOLOGY.** — For seniors; juniors may elect. As stated under Course 75.

10 laboratory hours, credit, 5.

Mr. AVERY.

Prerequisites, Microbiology 50 and 75.

80. **II. SOIL MICROBIOLOGY.** — For seniors; juniors may elect. Such subjects as the number and development of micro-organisms in different soils; the factors which influence their growth, food, reaction, temperature, moisture and aeration; the changes wrought upon inorganic and organic matter in the production of soil fertility, ammonification, nitrification and denitrification; fixation of nitrogen symbiotically and non-symbiotically; methods of soil inoculation receive attention.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisites, Microbiology 50 and 51.

81. **I. HYGIENIC MICROBIOLOGY.** — For seniors; juniors may elect. An attempt will be made to select certain material which is basic to public hygiene and sanitation, as applied to man and animals. The microbiology of water supplies, food supplies, vaccines, antisera or antitoxins; the channels by which micro-organisms enter the body, the influence of body fluids and tissues upon them, body reactions with micro-organisms (susceptibility and immunity); the micro-organisms of some of the most important infectious diseases, methods of control, including disinfectants and disinfection, antiseptics, antiseptis and asepsis, will be treated.

10 laboratory hours, credit, 5.

Assistant Professor ITANO.

Prerequisites, Microbiology 50 and 51.

82. **I. DAIRY MICROBIOLOGY.**—For seniors; juniors may elect. Special emphasis is placed upon milk supplies. The microbial content of milk, its source, its significance, its control; microbial taints and changes in milk; groups or types of organisms found in milk; milk as a carrier of disease-producing organisms; the value of straining, aeration, clarification, centrifugal separation, temperature, pasteurization; the abnormal fermentations of milk; bacteriological milk standards and their interpretation; ripening of milk and cream; the bacterial content of butter; a passing survey of the microbiology of cheeses; a study of special dairy products, as ice cream, condensed milk, artificial milk drinks (the products of microbial actions), represents a list of topics considered.

10 laboratory hours, credit, 5.

Professor MARSHALL and Miss GARVEY.

Prerequisites, Microbiology 50 and 51.

83. **III. FOOD MICROBIOLOGY.**—For seniors; juniors may elect. A study of the principles of food preservation, and food preservation by means of drying, canning, refrigerating and addition of chemicals, will be pursued. Food fermentations, as illustrated by bread, pickles, sauerkraut, ensilage, vinegar, wine, etc., will be examined. Decomposition of foods, as may be seen in meat, oysters, fish, milk, etc., as well as diseased and poisonous foods, will receive consideration. Contamination of food supplies by means of water, sewage, handling, exposure, diseased persons, etc., is of especial significance, and will be demonstrated by laboratory exercises. Laboratory inspection of foods is now a subject of great import and is given attention.

10 laboratory hours, credit, 5.

Professor MARSHALL and Miss GARVEY.

Prerequisites, Microbiology 50 and 51.

Physics.

Professor HASBROUCK, Professor HARRINGTON, Mr. ALDERMAN.

The fundamental and basic importance of the laws and phenomena of physics makes necessary no explanation of the introduction of this subject into the curriculum of an agricultural college. The logical development of the subject emphasizes the importance of physics as a science in itself. Special emphasis is laid, however, on the correlation of the principles studied with the sciences of agriculture, botany, chemistry and zoology, thus furnishing an extra tool by use of which the student's work in all the subjects may be more effective.

In Courses 25, 26 and 27 the subject-matter is presented with the idea of its special application primarily in the work in agriculture and general science. The full year's work is advised for all students continuing work specifically in the Division of Science. Courses 25 and 26 are required of all students. The subject-matter is especially selected and arranged for its practical application rather than its theoretical development. Courses 50, 51 and 52 are advised for students in chemistry, general biology, microbiology and general science. The subject-matter is selected, and the courses developed, with the idea of making the student proficient in laboratory manipulation. Sufficient theory is given in connection with the work to enable the student to apply the knowledge and practice thus gained in the departments indicated above.

The department has at its command a building on the east campus, containing a general lecture room and laboratory for sophomore work, a laboratory for junior work, and in the basement one small laboratory for quantitative work in light measurement. There is also in the basement a fairly well-equipped shop for the repair and construction of apparatus used in the department work. The usual apparatus for the demonstration in the lecture room is in the possession of the department.

Required Courses.

25. **I. GENERAL PHYSICS.** — Sophomores. Mechanics of solids and fluids. This course includes statics, with equilibrium of rigid bodies, work, energy and friction; kinematics, considering rectilinear motion and motion in a curved path; harmonic motion; rotation of rigid bodies, including kinematics of rotation; liquids and gases, with properties of fluids at rest and in motion; properties of matter and its internal forces, including elasticity, capillarity, surface tension.

3 class hours.

1 2-hour laboratory period, 4 study hours, credit, 9.

Professors HASBROUCK and HARRINGTON and Mr. ALDERMAN.

26. **II. ELECTRICITY AND MAGNETISM.** — Sophomores. Includes such subject-matter as magnetism, electrostatics, electric currents with their production, chemical, heating and mechanical effects; battery cells, measurement of voltage, current flow and resistance, motors and generators.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professor HARRINGTON and Mr. ALDERMAN.

Elective Courses.

27. **III. HEAT AND LIGHT.** — For sophomores; juniors and seniors may elect. Thermometry, expansion, colorimetry and specific heat, transmission of heat, changes of state, radiation and absorption. Wave theory of light, optical instruments, analysis of light, color, interference, diffraction, polarization.

3 class hours.

1 2-hour laboratory period, credit, 4.

Professor HASBROUCK and Mr. ALDERMAN.

50. **I.** 51. **II.** 52. **III. EXPERIMENTAL PHYSICS. MECHANICS, SOUND, HEAT, LIGHT, ELECTRICITY AND MAGNETISM.** — For juniors; seniors may elect. This course consists of a series of physical measurements in the laboratory, accompanied by lectures. The lectures deal chiefly with the methods and principles involved in the laboratory work. High-grade instruments of precision are employed in the laboratory work, and the student is expected to acquire some ability to make accurate observations. The primary object of the course is to develop in the student scientific habits of thinking by direct personal observation of physical phenomena.

1 class hour.

2 2-hour laboratory periods, credit, 3.

Professor HARRINGTON.

Prerequisite, Physics 27 or other science, subject to the approval of the Department.

55. **III. ANALYTICAL MECHANICS.** — For juniors; seniors may elect. An introduction to the application of the calculus to the mechanics of solids; statics and kinetics of rigid bodies; elasticity; vector analysis. For students who have taken or are taking Mathematics 52.

3 class hours.

Credit, 3.

Mr. ALDERMAN.

75. **I.** 76. **II.** 77. **III. THEORY OF LIGHT.** — For seniors. Propagation of light, formation of optical images, photography, optical instruments, interference, diffraction, spectroscopy, optical phenomena of the atmosphere, polarization and double refraction, magneto-optics, photo-electricity, radiation, electromagnetic waves, X-rays and crystal structure, electron theory, principle of relativity.

3 class hours.

Credit, 3.

Professor HARRINGTON.

Prerequisite, Mathematics 51.

Veterinary Science and Animal Pathology.

Professor GAGE, Assistant Professor LENTZ, Assistant Professor PYLE.

The courses in veterinary science have been arranged to meet the needs (1) of students who propose following practical agriculture; (2) of prospective students of human and veterinary medicine; and (3) of teachers and laboratory workers in the biological sciences.

The department occupies a modern laboratory and hospital stable, built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There is a lecture hall, a museum, a demonstration room, a photographing room and a workshop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in every department of veterinary science, including pathology, serology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

Elective Courses.

50. **II. VETERINARY HYGIENE AND STABLE SANITATION.** — For juniors; seniors may elect. Familiarizes students with the relation of water, food, air, light, ventilation, care of stables, disposal of excrement, individual hygiene, etc., to the prevention of disease in farm animals.

5 class hours.

Credit, 5.

Assistant Professor LENTZ.

53. **I. GROSS VETERINARY ANATOMY.** — For juniors; seniors and graduate students may elect. The detailed study of the skeleton is followed by dissection of the muscular system and the study of joints. Not offered in 1923-24.

2 3-hour laboratory periods, credit, 3.

The DEPARTMENT.

54. **II. GROSS VETERINARY ANATOMY.** — For juniors; seniors and graduate students may elect. The continuation of Veterinary 53, consisting of dissection and study of the circulatory, nervous, digestive, respiratory, and genito-urinary systems. Not offered in 1923-24.

2 3-hour laboratory periods, credit, 3.

The DEPARTMENT.

Prerequisite, Veterinary 53.

75. **I. COMPARATIVE (VETERINARY) ANATOMY.** — For seniors; juniors may elect. The anatomy of the horse is studied in detail, and that of other farm animals, particularly the ox. This course is essential for those students wishing to elect Course 77. It is a lecture and demonstrational course and open to all students interested. It is not a course in dissection anatomy.

5 class hours.

Credit, 5.

Assistant Professor LENTZ.

76. **II. GENERAL VETERINARY PATHOLOGY.** — For seniors; juniors may elect. Fundamental, general, pathological conditions, as for example, inflammation, fever, hypertrophy, atrophy, etc., a knowledge of which is essential in prevention, diagnosis, and treatment of disease, are studied. The course in pathology is followed by a brief consideration of materia medica, therapeutic measures, and poisonous plants.
5 class hours.

Credit, 5.

Assistant Professor LENTZ.

77. **III. APPLIED GENERAL PATHOLOGY.** — For seniors; juniors may elect. This course is a continuation of Course 76. Particular attention is given to the etiology, the pathogenesis and the prophylaxis of the communicable and non-communicable diseases of the different species of domesticated animals. Lectures and demonstrations.
5 class hours.

Credit, 5.

Assistant Professor LENTZ.

Prerequisites, Veterinary 75 or Veterinary 78, 79 and 80.

78. **I. ESSENTIALS OF GENERAL PATHOLOGY.** — For seniors; juniors may elect. Introduces students to some of the essential anatomical, histological and general physiological phenomena essential to the understanding of some of the simple general pathological conditions found in domestic animals. Some of the common methods of diagnosis are considered in the laboratory. The various chemical and biological reactions and tests are presented from the standpoint of pure science, showing applications of chemistry and biology. The course serves to educate liberally and stimulate in the student of agriculture the appreciation of some of the methods used in animal pathology for detecting and controlling some of the more common animal diseases. Lectures, demonstration and laboratory work.

2 3-hour laboratory periods, credit, 3.

Professor GAGE.

79. **II. ESSENTIALS OF GENERAL ANIMAL PATHOLOGY.** — For seniors; juniors may elect. A continuation of Course 78, devoted to a study of some of the common pathological conditions by means of prepared sections, the aim being to demonstrate to the student abnormal animal histological structures commonly observed when material from various cases of animal diseases is prepared for microscopical study. Some of the biological products used in protecting animals against disease are considered.

2 3-hour laboratory periods, credit, 3.

Professor GAGE.

Prerequisite, Veterinary 78.

80. **III. ESSENTIALS OF GENERAL ANIMAL PATHOLOGY.** — For seniors; juniors may elect. As stated in Courses 78 and 79.

2 3-hour laboratory periods, credit, 3.

Professor GAGE.

Prerequisite, Veterinary 79.

85. **I. AVIAN PATHOLOGY.** — For seniors; juniors may elect. A course in poultry diseases. The object is to present information concerning the common diseases of poultry, their etiology, diagnosis and prevention. Consists of a systematic study of the diseases of the alimentary tract, liver and abdominal region, followed by a study of the diseases of the respiratory system, circulation and kidneys. The important disease-producing external and internal parasites are considered; also diseases of the skin and reproductive organs. Lectures and demonstrations.

2 3-hour laboratory periods, credit, 3.

Assistant Professor PYLE.

86. **II. AVIAN PATHOLOGY.** — For seniors; juniors may elect. As stated under Course 85, also devoted to the study of some of the special diseases of poultry. Recent methods used in the control of these diseases are considered and opportunity offered the student for demonstrating various disease processes by means of prepared slides. Lectures, demonstrations and laboratory work.

2 3-hour laboratory periods, credit, 3.
Assistant Professor PYLE.

Prerequisite, Veterinary 85.

87. **III. AVIAN PATHOLOGY.** — For seniors; juniors may elect. As stated under Courses 85 and 86.

2 3-hour laboratory periods, credit, 3.
Assistant Professor PYLE.

Prerequisite, Veterinary 86.

Zoölogy and Geology.

Professor GORDON, Mr. FOSS.

The facts and principles of the sciences of zoölogy and geology have important applications in industry and the arts, and with those of their sister sciences form a body of knowledge of value and interest with which the educated man finds it necessary to gain a close familiarity. The elective courses in this department stand as offerings to students who wish to supplement their work in other departments, or who, for any reason, wish to enlarge their knowledge in either zoölogy or geology. Students are encouraged to consult the department about any courses which may be available to them, and which might prove necessary or helpful for any line of work they may wish to follow.

The building occupied jointly by the department of entomology and the department of zoölogy and geology has for the work in zoölogy and geology laboratories equipped with gas, compound microscopes and the accessories needed for study, research and demonstration in these subjects. There are two lecture rooms used jointly by the two departments. The Zoölogical Museum has a representative collection of several thousand specimens of animals, and is drawn upon for material illustrating the various courses.

ZoöLOGY.

Required Course.

25. **I. GENERAL PRINCIPLES AND TEACHINGS OF ZoöLOGY.** — Sophomores. An introductory course in which some of the basic features of animal structure, functions of organs and relations of animals to each other are emphasized. In the laboratory work an attempt is made to give first-hand knowledge of animals as a means to a better understanding of some modern conceptions that have grown out of zoölogical science, and with which the lectures deal. Not given, I term, in 1923-24.

2 class hours.

2 2-hour laboratory periods, credit, 4.
The DEPARTMENT.

Elective Courses.

26. **II. ELEMENTS OF MAMMALIAN ANATOMY.** — Sophomores; juniors and seniors may elect. An introductory course which aims to acquaint the student with the positions, relations, names and functions of the principal organs and systems of organs of the mammalian body.

1 class hour.

2 2-hour laboratory periods, credit, 3.
The DEPARTMENT.

Prerequisite, Zoölogy 25.

50. **I. SYNOPSIS INVERTEBRATE ZOÖLOGY.** — Juniors; seniors may elect. A course in which the student examines and compares representatives of the various phyla, classes and orders of the non-vertebrate animals.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Prerequisite, Zoölogy 25.

51. **II. SYNOPSIS INVERTEBRATE ZOÖLOGY.** — Juniors; seniors may elect. Continuation of Course 50.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Prerequisite, Zoölogy 50.

52. **III. SYNOPSIS INVERTEBRATE ZOÖLOGY.** — Juniors; seniors may elect. Continuation of Course 51.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Prerequisite, Zoölogy 51.

54. **II. ELEMENTS OF MICROSCOPIC TECHNIQUE AND HISTOLOGY.** — Juniors; seniors may elect. The student is taught the usual methods of preparing material for microscopic examination, including embedding in paraffin and celloidin, sectioning, and differentiation by stains. Supplemented by a microscopic study of selected normal animal tissues in connection with their physiological properties.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

75. **I. SPECIAL ZOÖLOGY.** — Juniors, seniors and graduates may apply for such special work as they are qualified to undertake.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

76. **II. SPECIAL ZOÖLOGY.** — Same as Course 75.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

77. **III. SPECIAL ZOÖLOGY.** — Same as Course 75.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

79. **III. ORNITHOLOGY.** — A study of the taxonomic characters, distribution and habits of birds.

1 class hour.

2 2-hour laboratory periods, credit, 3.

The DEPARTMENT.

Geology.

27. **III. GENERAL GEOLOGY.** — Sophomores; juniors and seniors may elect. A course in the physical aspects of geology, dealing with the origin, arrangement and manifold changes of the materials composing the earth's crust. Excursions by arrangement.

3 class hours.

2 2-hour laboratory periods, credit, 5.

Professor GORDON.

DIVISION OF THE HUMANITIES.

Professor LEWIS.

Economics and Sociology.

Professor LEWIS, Professor SIMS.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

The courses in economics and sociology are planned with the purpose of giving the student that knowledge and understanding of the important factors and problems in this field of study and life which every active citizen and educated man ought to have.

Required Course.

25. **I. INTRODUCTION TO ECONOMIC PRINCIPLES AND PROBLEMS.** — For description of course see Course 51, **I**.
3 class hours. 6 study hours, credit, 9.

Elective Courses.

26. **II. CIVILIZATIONS, ANCIENT AND MODERN.** — For sophomores; others may elect. The evolutionary origin and history of man; characteristics of primitive man, departure from the animal status and beginnings of civilization; origin and development of industries, arts and sciences; the evolution of languages, warfare, migrations and social institutions; a study of the powerful natural and human forces that have brought man from the early stages to modern development; characteristic features of the leading civilizations and races of ancient and modern times; beneficial and dangerous factors in American life in view of the history of human civilization.
5 class hours. Credit, 5.

50. **II. BUSINESS AND INDUSTRY.** — For juniors and seniors. The forms, organization, administration and labor problems of business. Methods of organizing, financing and administering corporations and partnerships; forms of business administration, wholesaling, jobbing, retailing, advertising, credits and collections; systems of industrial remuneration for wage earners, co-operation and preserving industrial peace; problems concerned with protective legislation for workmen and employers, sweated industries, prison labor, child labor and industrial education.
5 class hours. Credit, 5.

51. **I. INTRODUCTION TO ECONOMIC PRINCIPLES AND PROBLEMS.** — For juniors. Definitions of economic terms, such as wealth, capital, value, etc.; factors of production, exchange and consumption; principles of economic production, supply and demand, diminishing returns, division of labor, productive organization, concentration of capital and labor, trust and monopoly problems, public control of production and distribution; principles of exchange, theories of value, money and its problems; international trade, tariff and free trade theories, American merchant marine, reciprocity, and trade treaties; forms of income, wages, interest, rent, profits and the forces which govern them; principles of spending, economy, luxury, conservation of individual and national resources; principles and agencies for saving, investments, banks, building associations, insurance of all kinds; schemes for social organization; socialism, communism, industrial democracy. Textbook and readings.
5 class hours. Credit, 5.

75. **I. SOCIAL INSTITUTIONS AND SOCIAL REFORMS.** — For seniors; juniors by permission. Social institutions, such as the family, the State, property, religions; and such current problems as eugenics, race suicide, divorce, crime and delinquent classes, prison reform, prevention and treatment of dependents and defectives, poverty, its causes and preventions; constructive modern social reform movements for insurance of wage earners, protection of childhood, assurance of safety, health and play time for all classes. The correctional and charitable institutions of Massachusetts are studied in considerable detail.

5 class hours.

Credit, 5.

Professor SIMS.

77. **III. PUBLIC FINANCE, TAXATION, MONEY AND BANKING.** — For seniors. Systems and problems of taxation as they are found in Europe and America; objects for spending public revenue; public debts and methods of organizing them; systems of money and currency problems of America; types, methods and functions of banks; economic and financial crises and depressions in the United States; modern war finance. Readings and lectures.

5 class hours.

Credit, 5.

History and Government.

Required Course.

25. **I. AMERICAN GOVERNMENT.** — A study of the structure and operation of the machinery of our government; also a study of the history of its development from its inception to the present day.

3 class hours.

5 study hours, credit, 8.

Elective Courses.

50. **III. GOVERNMENT.** — For juniors; seniors may elect. Forms and working methods of the governments of Great Britain, Germany, France, Russia, Switzerland, New Zealand and Canada; historic types and theories of government; forms and methods of Federal, State and local governments in America; progress and problems of democracy and new reform movements in organization and administration; new tendencies towards social legislation and extension of governmental control.

5 class hours.

Credit, 5.

54. **I. MODERN EUROPEAN HISTORY.** — Juniors; seniors may elect. The modern history of the principal countries of Europe, especially the great movements and revolutions that developed the nations up to the present generation.

3 class hours.

Credit, 3.

79. **II. EUROPEAN HISTORY SINCE 1870.** — For seniors; juniors may elect. The Franco-Prussian War and the formation of the German Empire, the unification of Italy, the Third French Republic, European Expansion in the East, the Russo-Japanese War, and the origin, events and probable results of the War of 1914. While a continuation of Course 54, this course will be complete in itself, and may be elected by those who have had no history training. Its aim is to provide the basis for an understanding of present-day conditions, and for an intelligent participation in world affairs.

3 class hours.

Credit, 3.

Languages and Literature.

Professor LEWIS, Professor PATTERSON, Professor MACKIMMIE, Professor ASHLEY, Assistant Professor PRINCE, Assistant Professor RAND, Miss GOESSMANN, Mr. THISELL, Mr. BÖGHOLT.

ENGLISH.

Required Courses.

1. **I. 2. II. 3. III.** ENGLISH. — Freshmen. Composition. Intended to teach straight thinking, sound structure, clear and correct expression. Lectures, recitations, theme writing and conferences.

3 class hours, 5 study hours.

Credit, 8, **I, II** terms.

3 class hours, 6 study hours.

Credit, 9, **III** term.

Professors PATTERSON, PRINCE, RAND and Mr. BÖGHOLT.

25. **I.** ENGLISH. — Sophomores. A general reading course in English literature.

2 class hours, 4 study hours.

Credit, 6.

Professor PATTERSON and Miss GOESSMANN.

26. **II.** ENGLISH. — Sophomores. A general reading course in English literature.

2 class hours.

Credit, 2.

Professor PATTERSON and Miss GOESSMANN.

27. **III.** ENGLISH. — Sophomores. A general reading course in English literature.

2 class hours.

Credit, 2.

Professor PATTERSON and Miss GOESSMANN.

28. **I.** ENGLISH. — English composition, oral and written.

1 class hour, 2 study hours.

Credit, 3.

Professors PATTERSON, PRINCE, RAND and Mr. BÖGHOLT.

Elective Courses in English Language and Literature.

50. **I.** ENGLISH POETRY OF THE ROMANTIC PERIOD (1923-24). — Alternates with Course 53. For juniors; seniors may elect. A course in history, appreciation and understanding. Some of the writers studied are Gray, Goldsmith, Burns, Scott, Wordsworth, Coleridge, Byron, Keats and Shelley.

3 class hours.

Credit, 3.

Professor PATTERSON.

51. **II.** ENGLISH POETRY IN THE NINETEENTH CENTURY (1924-25). — Alternates with Course 54. For juniors; seniors may elect. In general, this course is like Course 50. Tennyson, Browning, Mrs. Browning, Arnold, Clough, the Rossettis, Morris, Swinburne and others.

3 class hours.

Credit, 3.

Professor LEWIS.

57. **III.** ENGLISH POETRY IN THE NINETEENTH CENTURY (1924-25). — Alternates with Course 58. For juniors; seniors may elect. As stated under Course 51.

3 class hours.

Credit, 3.

Professor LEWIS.

52. **III.** ENGLISH WRITERS FROM MILTON TO POPE. — For juniors; seniors may elect. A survey course that emphasizes the leading writers, literary currents and the

thought of the period. Some of the writers studied are Milton, Dryden, Addison, Swift and Pope.

3 class hours.

Credit, 3.

Professor PATTERSON.

53. **I. ENGLISH PROSE OF THE ROMANTIC PERIOD (1924-25).** — For juniors; seniors may elect. A course in English prose paralleling Course 50. Some of the writers studied are Goldsmith, Coleridge, Lamb, DeQuincey and Hazlitt.

3 class hours.

Credit, 3.

Professor PATTERSON.

54. **II. ENGLISH PROSE IN THE NINETEENTH CENTURY (1923-24).** — For juniors; seniors may elect. Parallels Course 51. Among the writers considered will be Macaulay, Carlyle, Ruskin, Newman and Arnold.

3 class hours.

Credit, 3.

Professor LEWIS.

55. **III. ENGLISH PROSE IN THE NINETEENTH CENTURY (1923-24).** — For juniors; seniors may elect. As stated under Course 54. Alternates with Course 57.

3 class hours.

Credit, 3.

Professor LEWIS.

56. **II. AMERICAN LITERATURE.** — For juniors; seniors may elect. A course in the chief American prose writers; among those studied being Franklin, Brockden, Brown, Irving, Cooper, Poe, Hawthorne, Emerson, Thoreau, Lowell, Holmes, Parkman.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

57. **III. AMERICAN LITERATURE.** — For juniors; seniors may elect. A course in the chief American poets; among those studied being Freneau, Bryant, Poe, Emerson, Longfellow, Whittier, Holmes, Lowell, Whitman, Lanier.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

60. **I. THE LITERATURE OF RURAL LIFE.** — For juniors; seniors may elect. A critical and appreciative study of writers, both in prose and poetry, who have interpreted nature from the viewpoint of the lover of country life, and those who have idealized agriculture, horticulture and other rural pursuits, together with those who have upheld as an ideal the development of a rural environment in cities.

3 class hours.

Credit, 3.

Miss GOESSMANN.

61. **II. THE LITERATURE OF RURAL LIFE.** — For juniors; seniors may elect. As stated under Course 60.

3 class hours.

Credit, 3.

Miss GOESSMANN.

Prerequisite, English 60.

65. **I. ADVANCED COMPOSITION.** — For juniors; seniors may elect. Advanced work in expository writing, based upon specimens by contemporary authors and upon the personal experience of the student. Particular attention is given to organization, diction and style.

3 class hours.

Credit, 3.

Assistant Professor RAND.

66. **II. ADVANCED COMPOSITION.** — For juniors; seniors may elect. The preparation of theses and similar manuscripts upon subjects selected by the student. The foundation of this course lies in an orderly accumulation of material followed by an intelligent and readable interpretation of its significance.

3 class hours.

Credit, 3.

Assistant Professor RAND.

67. **III. ADVANCED COMPOSITION.** — For juniors; seniors may elect. Work in journalistic and fictional narrative with supplementary reading.

3 class hours.

Credit, 3.

Assistant Professor RAND.

75. **III. PROSE FICTION.** — The short story or the novel. For seniors; juniors may elect. Readings, reports and discussions. Not offered in 1923-24.

3 class hours or library equivalents.

Credit, 3.

79. **II. SHAKESPEARE.** — For seniors; juniors may elect. A cursory survey of the origin and rise of English drama is followed by the reading of about fifteen of Shakespeare's plays, selected to indicate the evolution of the dramatist and to emphasize the various phases of his art. Every attempt is made to deepen the student's appreciation of the personalities to be found in the plays, and of the beauty of the many memorable poetic passages.

3 class hours.

Credit, 3.

Assistant Professor RAND.

80. **III. MODERN DRAMA.** — For seniors; juniors may elect. This course traces the development of English drama from the time of the Restoration to the present day. The purpose of the course is to impart an intelligent and sympathetic interest in the theatre of the Twentieth Century.

3 class hours.

Credit, 3.

Assistant Professor RAND.

PUBLIC SPEAKING.

Elective Courses.

50. **I. ARGUMENTATION.** — For juniors; seniors may elect. Presents the fundamental principles of argumentation as applied to oral and written discourse, and develops in the student power to handle argument convincingly and persuasively. Lectures, discussions of leading questions of the day, practice in brief-drawing and the writing of forensics. The course is recommended for those who desire to enter the intercollegiate debates.

3 class debates.

Credit, 3.

Assistant Professor PRINCE.

Prerequisite, Public Speaking 1, 2 or 3.

51. **II. OCCASIONAL ORATORY.** — For juniors; seniors may elect. A study of the principles and the practice of formal oratory; the preparation and delivery of one original oration; prescribed reading in oratory. The course is recommended for those who wish to enter the Flint Contest.

3 class hours.

Credit, 3.

Assistant Professor PRINCE.

Prerequisites, Public Speaking 1, 2 or 3.

French and Spanish.

Professor MACKIMMIE, Mr. THISSELL.

The aim of the courses in French and Spanish is to give the student a practical knowledge of these languages for the purpose of wider reading and research, to introduce him to some of their treasures in art and science, and through the literature to acquaint him with the people. In the elementary courses as much time as possible is given to oral work, to develop a speaking, as well as a reading, knowledge of the tongue.

FRENCH.

Required Courses.

1. **I.** 2. **II.** 3. **III.** **ELEMENTARY FRENCH.** — Freshmen; open upon arrangement to other students. The essentials of grammar are rapidly taught and will be accompanied by as much reading as possible. Required of freshmen presenting German for entrance who do not continue that language and have not studied French.

3 class hours, 6 study hours.

Credit, 9, **I, III** terms.

3 class hours, 5 study hours.

Credit, 8, **II** term.

Mr. THISSELL.

4. **I.** 5. **II.** 6. **III.** **INTERMEDIATE FRENCH.** — Freshmen; open upon arrangement to other students. Training for rapid reading. The reading of a number of short stories, novels and plays; composition, reports on collateral reading from periodicals and scientific texts in the library.

3 class hours, 6 study hours.

Credit, 9, **I, III** terms.

3 class hours, 5 study hours.

Credit, 8, **II** term.

Professor MACKIMMIE and Mr. THISSELL.

Prerequisite, required of freshmen who present two years of French for entrance and do not take German.

Elective Courses.

25. **I.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. Training for rapid reading; the reading of a number of short stories, novels and plays; readings from periodicals and scientific texts in the library.

3 class hours, 5 study hours.

Credit, 8.

Mr. THISSELL.

Prerequisites, French 1, 2 and 3.

26. **II.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisite, French 25.

27. **III.** **INTERMEDIATE FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisite, French 26.

28. **I.** **ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. A reading course. Balzac's "Eugénie Grandet" and "Le Père Goriot," and other masterpieces of the nineteenth century; Brunetière's "Honoré de Balzac" and

Harper's "Masters of French Literature," readings in the library and written reports.
3 class hours, 5 study hours.

Credit, 8.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6.

29. **II. ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. As stated under Course 28.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6.

30. **III. ADVANCED FRENCH.** — For sophomores; open upon arrangement to other students. General view of the history of French literature; Kastner and Atkins' "History of French Literature." Representative works of the important periods. Outside reading.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisites, French 25 and 26, or French 28 and 29.

50. **I. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. Meets the requirements of individual students and equips them with exact English equivalents for the French scientific terms in their particular science. Word lists of scientific terms are required, and also weekly readings and reports from scientific works in the subject in which they are majoring. Several scientific works are read.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

51. **II. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

52. **III. SCIENTIFIC FRENCH.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Mr. THISSELL.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

75. **I. FRENCH LITERATURE.** — For seniors; juniors may elect. The object of Courses 75, 76 and 77 is to give an introduction to recent movements in French literature. Course 75 deals with the drama, and plays by Augier, A. Dumas *fils*, Delavigne and other contemporary dramatists.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

76. **II. FRENCH LITERATURE.** — For seniors; juniors may elect. The novel. Works by Flaubert, the De Goncourts and Zola are read. Written reports are required on outside reading.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

77. **III. FRENCH LITERATURE.** — For seniors; juniors may elect. Modern criticism. Sainte-Beuve, "Causeries du Lundi" (Harper) and works by Taine and Renan. Reference book, Lanson's "Histoire de la Littérature Française."

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisites, French 4, 5 and 6, or French 25, 26 and 27.

SPANISH.

Elective Courses.

50. **I. ELEMENTARY SPANISH.** — For juniors; seniors may elect. Open to other students upon arrangement. Grammar, with special drill in pronunciation; exercises in conversation and composition. Reading from a reader and selected short stories.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

51. **II. ELEMENTARY SPANISH.** — For juniors; open to other students upon arrangement. As stated in Course 50.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisite, Spanish 50.

52. **III. ELEMENTARY SPANISH.** — For juniors; open to other students upon arrangement. As stated in Course 50.

3 class hours.

Credit, 3.

Professor MACKIMMIE.

Prerequisite, Spanish 51.

75. **I. MODERN SPANISH AUTHORS.** — Seniors. Reading from modern Spanish novel and drama. Translation of English into Spanish. Private reading.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 52.

76. **II. MODERN SPANISH AUTHORS.** — Seniors. As stated in Course 75.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 75.

77. **III. MODERN SPANISH AUTHORS.** — Seniors. As stated in Course 75.

2 class hours.

Credit, 2.

Professor MACKIMMIE.

Prerequisite, Spanish 76.

German and Music.

Professor ASHLEY.

GERMAN.

The courses in German are intended to give the student a reading knowledge of the language and to introduce to him some of the masterpieces of German literature. To the student interested in pursuing advanced reading in scientific German, opportunity is given to do corollary reading in his major subject, in collaboration with the head of that department.

Required Courses.

1. **I.** 2. **II.** 3. **III.** **ELEMENTARY GERMAN.** — Freshmen; open upon arrangement to other students. Grammar, composition and reading. Especial attention is given to oral work in German and to translation of English into German. Required of those presenting French for entrance who do not continue that language and have not studied German.

3 class hours, 6 study hours.

Credit, 9, **I, III** terms.

3 class hours, 5 study hours.

Credit, 8, **II** term.

Professor ASHLEY.

4. **I.** 5. **II.** 6. **III.** **INTERMEDIATE GERMAN.** — Freshmen; open upon arrangement to other students. Selected works of Schiller, Heine and Goethe. Grammar review and advanced prose composition.

3 class hours, 6 study hours.

Credit, 9, **I, III** terms.

3 class hours, 5 study hours.

Credit, 6, **II** term.

Professor ASHLEY.

Prerequisite, required of freshmen who present two years of German for entrance and do not take French.

Elective Courses.

25. **I.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. Reading of such works as Sudermann's "Frau Sorge," "Wilhelm Tell," "Die Journalisten," etc. Grammar review.

3 class hours, 5 study hours.

Credit, 8.

Prerequisites, German 1, 2 and 3.

26. **II.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Prerequisite, German 25.

27. **III.** **INTERMEDIATE GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 25.

3 class hours.

Credit, 3.

Prerequisite, German 26.

28. **I.** **ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. Reading and studying of Goethe's most important literary productions.

3 class hours, 5 study hours.

Credit, 8.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6.

29. **II.** **ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. Development of the German novel; rapid reading of great novelists.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 28.

30. **III.** **ADVANCED GERMAN.** — For sophomores; open upon arrangement to other students. As stated under Course 29.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 29.

50. **I. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. Reading in German of modern magazine articles and works of a scientific nature. Different work assigned according to needs of individual students.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

51. **II. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 50.

52. **III. SCIENTIFIC GERMAN.** — For juniors; seniors may elect. As stated under Course 50.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 51.

75. **I. GERMAN LITERATURE.** — Seniors. Advanced language and literary study. Conducted entirely in German. Lectures on German literature and history; life, customs and travel in Germany. Collateral readings, including masterpieces of different epochs, such as "Niebelungenlied," Goethe's "Faust" and one modern typical drama.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisites, German 28, 29 and 30.

76. **II. GERMAN LITERATURE.** — Seniors. As stated under Course 75.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 75.

77. **III. GERMAN LITERATURE.** — Seniors. As stated under Course 75.

3 class hours.

Credit, 3.

Professor ASHLEY.

Prerequisite, German 76.

78. **I. CONVERSATION AND COMPOSITION.** — For seniors; juniors may elect. Translating connected English into German. Reproducing outside readings in German orally in class.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisites, German 4, 5 and 6, or German 25, 26 and 27.

79. **II. CONVERSATION AND COMPOSITION.** — For seniors; juniors may elect. As stated under Course 78.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisite, German 78.

80. **III. CONVERSATION AND COMPOSITION.** — For seniors; juniors may elect. As stated under Course 78.

1 class hour.

Credit, 1.

Professor ASHLEY.

Prerequisite, German 79.

MUSIC.

Elective Courses.

50. **I. HISTORY AND INTERPRETATION OF MUSIC.** — For juniors; seniors may elect. History of music among the ancients; medieval and secular music; epoch of vocal counterpoint; development of monophony opera and oratorio; life and works of the greatest representatives of the classical school, — Bach, Händel, Haydn, Gluck and Mozart.

1 class hour.

Credit, 1.

Professor ASHLEY.

51. **II. HISTORY AND INTERPRETATION OF MUSIC.** — For juniors; seniors may elect. A continuation of Course 50. The Romantic school; Beethoven, Schubert, Weber, Mendelssohn, Schumann, Chopin, Berlioz and Liszt; Wagner and the opera.

1 class hour.

Credit, 1.

Professor ASHLEY.

52. **III. HISTORY AND INTERPRETATION OF MUSIC.** — For juniors; seniors may elect. The Modern school and Modern composers.

1 class hour.

Credit, 1.

Professor ASHLEY.

DIVISION OF RURAL SOCIAL SCIENCE.

President BUTTERFIELD.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Agricultural Economics.

Professor CANCE, Assistant Professor SAWTELLE, Mr. YOUNT.

Instruction in agricultural economics is designed to show that the agricultural industry justifies its existence chiefly as a supplier of food and raw textile materials for human consumption; that agricultural success is measured by production of values rather than by production of volume of agricultural products; that the goal of the farmer is the largest net profit over a long-time period; that agricultural production includes all processes from purchase of seed and fertilizer and preparation of seedbed until the product reaches the consumer, including collection, transportation, storage, financing, packing, handling and selling; that a knowledge of the business of agriculture and agricultural commerce is to-day more necessary than a knowledge of agricultural technique.

The work of this department is conducted by means of lectures, readings and research in both library and field. A catalogue, now containing some 12,000 cards, covering the various phases of agricultural economics, is maintained. The department is also supplied with a large collection of maps, charts and statistical reports on the prices and supply of agricultural products. A goodly number of regular reports of the Bureau of Markets and other divisions of the United States Department of Agriculture are available for the use of students. Two series of bound volumes of bulletins are kept in the department offices, with duplicate series in the college library; one series already contains 12 volumes on "Co-operation in Agriculture," and the other, 15 volumes on "Marketing of Farm Products."

Required Course.

26. **II. AGRICULTURAL INDUSTRY AND RESOURCES.** — Sophomores. A descriptive course dealing with agriculture as an industry and its relation to physiography, movement

of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States are studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions.

4 class hours.

1 2-hour laboratory period, credit, 5.

Professor CANCE.

Elective Courses.

50. **I. ELEMENTS OF AGRICULTURAL ECONOMICS.** — For juniors; seniors may elect. Designed to accompany or follow the course in elements of economics. Deals with the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; principles of rural credit; problems of land tenure and land values; taxation of farm property; and the maintenance of the economic status of the farmer. Lectures, text, readings, topics and field work.

5 class hours.

Credit, 5.

Professor CANCE.

51. **III. HISTORICAL AND COMPARATIVE AGRICULTURE.** — For juniors; seniors may elect. A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on the development of agriculture in New England. An attempt is made to measure the influence of times, peoples and countries in producing different systems of agriculture, and to ascertain the causes now working to effect agricultural changes. Lectures, readings and library work. Students in education and rural journalism should find this course helpful.

5 class hours.

Credit, 5.

Assistant Professor SAWTELLE.

52. **II. CO-OPERATION IN AGRICULTURE.** — For juniors; seniors may elect. The history, principles and business relations of agricultural co-operation. (1) A survey of the development, methods and economic results of farmers' organizations and great co-operative movements; (2) the business organization of agriculture abroad, and the present aspects and tendencies in the United States; (3) the principles underlying successful co-operative endeavor among farmers, practical working plans for co-operative associations, with particular reference to credit and purchase and the marketing of perishable products. Lectures, text, assigned readings and practical exercises.

5 class hours.

Credit, 5.

Professor CANCE.

53. **III. THE AGRICULTURAL MARKET.** — For juniors; seniors and graduate students may elect. A study of the forces and conditions which determine the prices of farm products and the mechanism, methods and problems concerned with transporting, storing and distributing them. Supply and demand, course of prices, terminal facilities, the middleman system, speculation in agricultural products, protective legislation, the retail market and direct sales are taken up. The characteristics and possibilities of the New England market are given special attention. Lectures, readings, assigned studies and field work.

5 class hours.

Credit, 5.

Professor CANCE.

75. **II. RURAL AND BUSINESS LAW.** — For seniors; juniors may elect. Land, titles, public roads, rights incident to ownership of live stock, contracts, commercial

paper and distinctions between personal and real property. Text, written exercises, lectures and class discussions.

5 class hours.

Credit, 5.

76. **II. TRANSPORTATION OF AGRICULTURAL PRODUCTS.** — For seniors and graduate students; juniors may elect. The development of highway, waterway and railway transportation and its relation to the agricultural development of the country; the principles governing the operation and control of transportation agencies; present-day problems relating to the shipment of farm products, rates, facilities and services; methods of reducing wastes in transportation; the economics of the good roads movement and of motor transportation. Lectures, text and field work.

5 class hours.

Credit, 5.

Professor CANCE.

77. **I. PROBLEMS IN AGRICULTURAL ECONOMICS.** — For seniors and graduate students; juniors may elect. An advanced course for those desirous of studying more intensively some of the economic problems affecting the farmer, such as: land problems, — land tenure, size of farms, causes affecting land values, private property in land, taxation of farm property; special problems, — cost of producing farm products, farm labor in New England, immigration, agricultural credit. Opportunity is given, if practicable, for field work, and students are encouraged to pursue lines of individual interest.

5 class hours.

Credit, 5.

Professor CANCE.

78. **III. AGRICULTURAL CREDIT FACILITIES.** — For seniors and juniors. Lectures, discussions and assigned readings on credit needs of farmers; the legitimate use of credit in the acquisition of land, and the production, storage and marketing of agricultural products; the development of national and State rural credit institutions and laws; the powers and methods of operation of credit institutions with reference to the supply of credit for agricultural purposes; the methods by which the individual may increase his credit standing and borrowing power; ways in which the present credit facilities may be increased.

3 class hours.

Credit, 3.

Assistant Professor SAWTELLE.

79. **I. AGRICULTURAL STATISTICS.** — For seniors, juniors and graduate students. The nature and sources of agricultural statistics, the methods of obtaining numerical facts, of analyzing and drawing conclusions from statistical data, and the methods of presenting in a true and forceful manner the statistical facts of the agricultural industry. Opportunity is given in the laboratory for practice in the use of statistical methods and processes, and to acquire experience in dealing with practical statistical problems. The application of statistics and statistical methods in the fields of agricultural economics, extension work, education, journalism and the business matters connected with farm operation is emphasized.

2 class hours.

3 2-hour laboratory periods, credit, 5.

Assistant Professor SAWTELLE.

80. **I. SEMINAR.** — For seniors and graduate students. Research in agricultural economics and history; problems of New England agriculture. Library work and reports. If desirable some other topic may be substituted.

Hours to be arranged.

1 2-hour conference period, credit, 1 or 2.

The DEPARTMENT.

81. **II. SEMINAR.** — For seniors and graduate students. As stated in Course 80.
1 2-hour conference period, credit, 1 or 2.
The DEPARTMENT.

82. **III. SEMINAR.** — For seniors and graduate students. As stated in Course 80.
1 2-hour conference period, credit, 1 or 2.
The DEPARTMENT.

83. **I. SALESMANSHIP OF AGRICULTURAL PRODUCTS.** — For seniors; juniors may elect. The course embraces a study of the principles and practices that are involved in the selling of goods and services. The application of these principles of salesmanship to the disposal of agricultural products is especially emphasized. Types of sales, motives for buying, securing interviews, types of prospects, preparation of sales talks, meeting objections and excuses, and sales demonstrations by students and the instructor are included.
2 class hours. Credit, 2.

84. **III. ADVERTISING AGRICULTURAL PRODUCTS.** — For seniors; juniors may elect. A course dealing with the application of the principles of advertising to agricultural products. A study of the nature of advertising, the economics of advertising, the use of media, copy, psychology as applied to advertising, layout, the advertising campaign, advertising agency, etc., is made. The solution of practical problems to emphasize different phases of advertising is required by students.
2 class hours. Credit, 2.

85. **II. AGRICULTURAL PRICES.** — For seniors and graduate students. A study of the prices of agricultural products and other commodities which are of importance in the agricultural industry. Limited to five students.
2 or 3 2-hour laboratory periods, credit, 2 or 3.
Assistant Professor SAWTELLE.

86. **III. AGRICULTURAL PRICES.** — For seniors and graduate students as stated in Course 85. Limited to five students.
2 or 3 2-hour laboratory periods, credit, 2 or 3.
Assistant Professor SAWTELLE.

87. **III. FOREIGN TRADE IN AGRICULTURAL PRODUCTS.** — For seniors and graduates; juniors may elect. A general course embracing a study of the principles and practices of international trade and the foreign commerce of the United States, particularly with reference to agricultural products. The development and present status of foreign trade in agricultural products, trade relations with foreign nations, the agencies and practices of foreign trade, foreign trade salesmanship and advertising, the status of New England with reference to foreign trade are some of the topics which will be presented. The work in the course will also include a personal study of special features of foreign trade and of the trade importance of specific subjects. Textbook, class discussions and class topics.
3 class hours. Credit, 3.

Agricultural Education.

Professor WELLES, Professor GLICK, Mr. HEALD,¹ Miss HAMLIN.

The primary aim of the department is to train students for service in some form of educational work. Students desiring state approval as teachers of agriculture or related subjects should confer with the head of the department as early as possible to insure a desirable range of preparation. They should also become acquainted with the State Agent for Agricultural Teacher-Training who approves candidates for positions in agricultural departments and special schools.

The department seeks to be of the greatest possible service to students who are prepared to teach and whose scholastic standing and qualifications generally seem to make them suitable candidates for positions. Students who major in other departments but expect to teach should consult this department regarding the educational courses best suited to their purposes.

The department recommends to the State Department of Education such graduates of the college as are entitled to receive the high school teachers' term certificate.

The department is thoroughly equipped for its work with classrooms, reference material, etc. The offices are in close proximity to the classroom.

Required Course.

26. **II. AGRICULTURAL OPPORTUNITIES FOR WOMEN.** — For sophomores. Designed to show the woman who is interested in agriculture what opportunities there are for her in that field, and how she may best take advantage of them. The types of agricultural work for which women are best adapted are discussed. A study is made of some of the special problems which confront the woman farmer, and her best ways of solving them.

2 class hours.

Credit, 2.

Miss HAMLIN.

Elective Courses.

51. **I and II. PRINCIPLES AND METHODS OF TEACHING.** — For juniors; seniors may elect. This course is intended primarily for students who expect to teach. Others should consult the head of the department before registering. It consists of a study of the general principles of teaching applied to particular cases. These cases are gathered in part by the class during assigned observation visits to classes in session in public schools and in part from the reports of the work of teachers. The attempt to solve the problems presented by these cases furnishes opportunity for fixing the ideas in methods. A good text in methods for secondary schools is the basis of the course.

5 class hours.

Credit, 5.

Professor WELLES.

52. **III. HISTORY AND PHILOSOPHY OF EDUCATION.** — For juniors; seniors may elect. A study of educational history in modern times, educational movements in the United States and their bearing on national aims and ideals, with special emphasis on education for a democracy.

5 class hours.

Credit, 5.

Professor GLICK.

55. **I. GENERAL PSYCHOLOGY.** — For juniors; seniors and graduates may elect. This is a basic course for those anticipating further study in psychology as well as a practical

¹ State Agent for Agricultural Teacher-Training representing the State Department of Education in the administration of vocational education acts.

and cultural course for those who can take only one course in this field. It deals with the fundamental principles of psychology; the evolution of mind in animals and man; various types and products of social organizations; abnormal psychology including hypnotism, dreams, mental disorders, etc.

5 class hours.

Credit, 5.

Professor GLICK.

56. **II. EDUCATIONAL PSYCHOLOGY.** — For juniors; seniors and graduates may elect. It is a direct application of psychology to the field of education and is a basic course for both general and specific methods. The course deals with the original nature of the child, the psychology of learning, individual differences, transfer of training, mental tests, etc. Intended primarily for prospective teachers, but open to others who are sufficiently interested.

5 class hours.

Credit, 5.

Professor GLICK.

Prerequisite, Agricultural Education 55 or consent of the instructor.

75. **II. PRINCIPLES OF SECONDARY EDUCATION.** — For seniors; juniors may elect. This is a study of the American high school, both junior and senior. It is designed to acquaint the student with the aims and objectives of the high school and the factors upon which the realization of these aims depend. Some of the specific topics included in the study are financial support, course of study, qualifications of teachers and recent tendencies and policies in secondary education.

3 class hours.

Credit, 3.

Professor GLICK.

76. **I and III. SPECIAL METHODS IN TEACHING VOCATIONAL AGRICULTURE.** — For seniors; juniors and others qualified may elect. Students must consult the head of the department before registering for this course. The work consists of outlining lessons and projects for the teaching of agriculture or related subjects in agricultural schools or departments; the application of principles of vocational education as embodied in the Smith-Hughes Act and other legislation relative to agricultural education; the necessary adjustments relating to the school, community and administrative officials; assigned study of agricultural departments in operation, etc.

5 class hours.

Credit, 5.

Professor WELLES.

77. **III. METHODS IN EXTENSION TEACHING.** — For seniors; juniors and others qualified may elect. The nature of this course requires that only those who are definitely interested be admitted. Candidates must consult the head of the department before registering. The course consists of a survey of the field of extension work and the methods by which this work is accomplished. The specific lines dealt with are those of the county agent, boys' and girls' club leader, county demonstration agent and agricultural specialist. The administration of county, state and federal extension service is included in the discussions. Some time will be required of each student in field observation of extension work. The course will be conducted jointly by members of the Extension Service staff and the department of Agricultural Education.

3 class hours.

Credit, 3.

Professor WELLES and EXTENSION SERVICE STAFF.

80. **I, II and III. SUPERVISED TEACHING.** — (Includes apprentice, practice and observation teaching.) Primarily for seniors; juniors and others qualified may be admitted by arrangement. Under certain conditions a student may absent himself from college during one term of his junior or senior year for supervised teaching. Such a procedure is particularly desired for those who are preparing to teach agriculture and

is in accordance with the state plan which specifies the apprentice method of training. For detailed information consult the head of the department.

Opportunities for practice teaching are sought on the campus and in nearby high schools for those who cannot absent themselves for a term of apprentice teaching. A limited amount of observation practice is permissible. Besides teaching a student is required to pursue a course of professional reading bearing upon the subject he is teaching or observing. In all cases he is required to make detailed teaching plans covering the subject-matter of the lessons and to outline the supporting projects. The amount of credit depends upon the number, character and length of teaching exercises and conferences. Scheduled by arrangement.

Credit, 1 to 5.
The DEPARTMENT.

81. **III. SEMINAR IN METHODS OF TEACHING.** — Open to seniors majoring in Agricultural Education; graduate students and others by arrangement. This is an opportunity for those definitely intending to teach to make further studies in special lines other than agriculture, which is provided for in Agricultural Education 76. These include methods in college teaching, special methods in science, etc.

1 2-hour conference period per week.

Credit, 1 or 2.
Professor WELLES.

Prerequisites, Agricultural Education 51 and 56 or equivalents.

83. **III. SEMINAR IN APPLIED PSYCHOLOGY.** — Open to seniors majoring in Agricultural Education; graduate students and others by arrangement. It is intended for those who desire to follow the application of psychology to special fields such as salesmanship, public office, extension work, education, business, advertising, etc.

1 2-hour conference period per week.

Credit, 1 or 2.
Professor GLICK.

Prerequisites, Agricultural Education 55 and 56 or 85.

85. **I. VOCATIONAL PSYCHOLOGY.** — For seniors and graduates; juniors may elect. A study of psychology as applied to vocational work other than education, such as salesmanship, advertising, medicine, law, vocational tests, selection and management of employees, etc.

3 class hours.

Credit, 3.
Professor GLICK.

Prerequisite, Agricultural Education 55 or consent of instructor.

Rural Sociology.

Professor PHELAN, President BUTTERFIELD, Professor SIMS, Mr. NOVITSKI.¹

The courses in rural sociology are designed for two purposes: first, to give students an appreciation of the general problems of country life; second, to afford a definite training for students who wish to take up some specific form of social service. In the last ten years rural sociology has been introduced as a subject into more than 50 per cent of the agricultural schools and colleges. There is a good demand for teachers, and an increasing opportunity in other directions in this subject. The courses afford the student an opportunity to pursue graduate as well as undergraduate work. The library of the college is unusually well equipped with rural sociological material.

¹ On leave of absence.

Required Course.

27. **III. ELEMENTS OF RURAL SOCIOLOGY.** — Sophomores. A broad survey of the field of rural sociology, including such topics as the origin of rural sociology, its methods and problems; relation of sociological to the scientific and technical aspects of agricultural problems; the development of the rural community in New England and the west, religious, educational and social ideals of rural people; characteristics and influence of the rural environment, the movement of the rural population, the effects of immigration; rural institutions, the school, the church, local government, effects of modern conditions of life on rural institutions; rural organization; problems of progress, and analysis of the needs of rural life in its further development. Lectures, readings and essays on assigned topics.

3 class hours.

Credit, 3.

Professor Sims.

Elective Courses.

50. **I. SOCIAL CONDITION OF RURAL PEOPLE.** — For juniors; seniors may elect. A. The rural status: composition of the rural population, nature, extent and causes of diseases and accidents, health agencies of control; extent and causes of rural delinquency and dependency, conditions of temperance, of morality and family integrity; child labor, women's work and position; standard of living, size of family; cultural ideals; community consciousness and activity; standards of business conduct and of political ethics.

B. Rural social psychology: characteristics of the rural mind, character of hereditary and environmental influence; nature and effect of face-to-face groups; fashion, conventionality, custom, character of discussion and of public opinion.

3 class hours.

Credit, 3.

Professor Sims.

51. **II. RURAL GOVERNMENT.** — For juniors; seniors may elect. A general survey of the development of rural government in the United States, origin of the New England town, its influence upon the west, county government, the influence of the farmer in legislation, good roads movement, credit facilities, taxation, boards of agriculture, agricultural colleges and experiment stations in relation to rural welfare; national government; a general survey of political organizations and movements among farmers in the United States and foreign countries and their influence in shaping legislation; relation of the Department of Agriculture, postal system, the various national commissions and agencies to rural welfare. Lectures, readings, written exercises on assigned topics.

3 class hours.

Credit, 3.

Professor Sims.

52. **III. RURAL ORGANIZATION.** — For juniors; seniors may elect. A study of the organized agencies by which rural communities carry on their various forms of associated life, particularly a study of the ways by which the domestic, economic, cultural, religious and political institutions contribute to rural betterment; principles underlying leadership, qualifications of the paid leader and the lay leader; the field of rural social service, national, State and local, preparation and opportunity for service; rural community building, a study of organized ways and means by which aid is given local communities. The method, scope and history of local, State and national associations formed about some farm product, their influence in forming class consciousness and in shaping agrarian legislation; need of federation. Lectures, readings and essays on assigned topics.

3 class hours.

Credit, 3.

Professor Sims.

76. **I. FIELD WORK IN RURAL SOCIOLOGY.**—For seniors; juniors may elect. Designed to meet the needs of students who wish to do some constructive work in rural social service while still in college. The work is carried on in co-operation with the various college agencies engaged in rural service. Any project for which credit in this course is to be asked must first have the approval of the head of the department.

From 2 to 6 laboratory hours, credits, 1 to 3.

Professor PHELAN.

Prerequisites, Rural Sociology 27 and 52.

77. **II. RURAL SOCIAL SURVEYS.**—For seniors; juniors may elect. A careful study of the theory and function of statistics, the limitations and difficulties in the use of statistics, the interpretation of statistical data, various methods of graphic representation; a study of surveys, kinds and use, method of gaining information, the basis for conclusions, value of information gained. Text and lectures.

3 class hours.

Credit, 3.

Professor SIMS.

79. **I. SEMINAR.**—Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

80. **II. SEMINAR.**—Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

81. **III. SEMINAR.**—Enrollment is limited to students who have had at least three courses in rural sociology, and to students majoring in the subject.

Credits, 1 to 3.

Professor PHELAN.

Rural Home Life.

MISS SKINNER, MISS BARTLEY.

The Department of Rural Home Life offers elective courses for students majoring in other departments of the college. Fundamentally this training is such as will help young women to be better prepared to adjust themselves readily to their environment in the home and in the community, and to help them realize their responsibility as good homemakers and as good citizens.

The food laboratory, located in the entomology building, is fitted with individual desks (cabinet form) to hold utensils and materials for each student. Each table is equipped with gas stoves. A storage cabinet is provided with bins for supplies and cupboard space for large utensils and illustrative material. This room is well lighted and pleasant. The clothing laboratory is located in the Adams House. The equipment consists of sewing machines, cabinets, work tables, cutting tables, electric irons, dress forms and a collection of materials illustrating the production of textiles for clothing and household use.

Required Courses.

1. **I. INTRODUCTION TO HOME ECONOMICS.**—Freshmen women. Lectures on the history and evolution of the home; social customs and their value in family relationships; healthful and suitable care of the wardrobe; principles of nutrition as applied to the student's life; the student's budget, and the keeping of personal accounts.

2 class hours.

Credit, 2.

MISS SKINNER.

Elective Courses.

25. **I.** 26. **II.** 27. **III.** **TEXTILES AND CLOTHING.** — Sophomores. The selection and purchase of suitable materials, their character, cost and durability. Appropriateness and simplicity in dress. Practical work in hand and machine sewing, drafting and designing of patterns, the care and repair of clothing. The work of the fall term is required of all sophomore women.

1 lecture.

1 2-hour laboratory period, credit, 3, **I** term.

1 lecture.

2 2-hour laboratory periods, credit, 3, **II**, **III** terms.

MISS BARTLEY.

50. **I.** **FOODS AND COOKERY.** — Juniors. — An introduction to the subject of foods in their scientific and economic aspects of selection, preparation and use.

2 class hours.

2 2-hour laboratory periods, credit, 4.

MISS SKINNER.

51. **II.** **FOODS AND COOKERY.** — Juniors. A continuation of Course 50, with stress upon meal planning and serving.

2 class hours.

2 2-hour laboratory periods, credit, 4.

MISS SKINNER.

52. **III.** **ADVANCED FOOD STUDY.** — Juniors. — A study of food materials in their relation to the daily dietary of families under various conditions; a consideration of dietary standards as influenced by age, sex and occupation; a comparative study of the nutritive values of usual foods.

2 class hours.

2 2-hour laboratory periods, credit, 4.

MISS SKINNER.

76. **II.** **HOUSEHOLD MANAGEMENT (1923-24).** — Juniors and seniors. The application of the principles of scientific management to the household, and the elements of successful home making. The family income, cost of living, household accounts, the budget and its apportionment. The responsibility of the woman to her family and the community in establishing right standards of living. Given in alternate years.

4 class hours.

Credit, 4.

MISS SKINNER.

78. **III.** **HOME NURSING (1923-24).** — Juniors and seniors. A study of the care of the family health; simple diseases and their prevention; the care of young children and invalids; first aid to the injured. Given in alternate years.

3 class hours.

Credit, 3.

MISS SKINNER.

GENERAL DEPARTMENTS.

[Heavy-faced type indicates the term in which the course is given. Numbering of courses: 1 to 24, inclusive, freshmen; 25 to 49, inclusive, sophomores; 50 to 74, inclusive, juniors; 75 to 99, inclusive, seniors.]

Military Science and Tactics.

Major HERMAN KOBBE, Cav. (D. O. L.), U. S. A.; Captain DWIGHT HUGHES, Jr., Cav. (D. O. L.), U. S. A.; Captain THOMAS BRADY, Jr., Cav. (D. O. L.), U. S. A.; Captain JAMES V. V. SHUFFELT, Cav. (D. O. L.), U. S. A.; Technical Sergeant JOHN J. LEE, U. S. A., Retired; Technical Sergeant JAMES A. WARREN, Cav. (D. E. M. L.), U. S. A.; and a detachment of enlisted men of the United States Army.

Under act of Congress (July 2, 1862) military instruction under a regular army officer was required in this college of all able-bodied male students. Under act of Congress June 3, 1916, as amended by act of Congress Sept. 8, 1916, there was established at this college in April, 1917, an infantry unit of the Reserve Officers' Training Corps.

Following the World War and an act of Congress (July 9, 1918) the Reserve Officers' Training Corps is in operation under the regulation of the War Department, administered by the president of the college and the professor of military science and tactics.

Beginning with the fall term, 1920-21, the infantry unit of the Reserve Officers' Training Corps was converted into a cavalry unit.

The primary object of the Reserve Officers' Training Corps is to provide systematic military training at civil educational institutions, for the ultimate purpose of qualifying selected students of such institutions as reserve officers in the military forces of the United States. It is intended to attain this object during the time the students are pursuing their general or professional studies, with the least practicable interference with their civil careers, by employing methods designed to fit men physically, mentally and morally for pursuits of peace as well as war.

All candidates for a degree in a four-year course must take for two years at least three hours a week of military training.

Students in their junior and senior years, who are approved by the president and the professor of military science and tactics, may take the advanced course if they so elect. The advanced course consists of at least five hours per week and a summer camp of about six weeks during the summer vacation, between the junior and senior years. Students taking this course are paid by the Federal government at a rate to be fixed by the Secretary of War, not to exceed the value of the army ration. The rate now fixed is 40 cents per day, which amounts to about \$146 per year. Students graduating in the advanced course are eligible for commissions in the Officers' Reserve Corps, *but are not required to accept such commissions if offered.*

The required uniform is of olive drab woolen cloth, and is furnished for the use of the students by the Federal government without cost. It is worn by all cadets when on military duty. New uniforms are furnished each year.

The course for cavalry units of the Reserve Officers' Training Corps includes theoretical and practical instruction in all phases of cavalry work, so distributed over the four-year college course as to qualify students at the end of the freshman year as privates of cavalry; at the end of the sophomore year as non-commissioned officers of cavalry; and upon graduation as reserve officers. The instruction in this department covers cavalry drill, cavalry weapons, — *i.e.*, rifle, pistol, saber, automatic rifle and machine gun, — map reading and military sketching, minor tactics, equitation, etc. The course in equitation includes cross country riding and instruction in polo. So far as season and weather permit, instruction is of a practical nature out of doors.

Required Courses.

1. **I.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

2. **II.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

3. **III.** — Freshmen. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

25. **I.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

26. **II.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

27. **III.** — Sophomores. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 3.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

Elective Courses.

50. **I.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

51. **II.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

52. **III.** — Juniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

75. **I.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

76. **II.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

77. **III.** — Seniors. Theoretical and practical instruction in military science and tactics, and lectures on military subjects.

Credit, 5.

THE PROFESSOR OF MILITARY SCIENCE
AND TACTICS, and ASSISTANTS.

Physical Education and Hygiene.

Professor HICKS, Assistant Professor GORE, Mrs. HICKS, Mr. GRAYSON, Mr. GORDON, Mr. DERBY.

The purpose of the courses offered by this department is to provide active exercise and to instruct every student how to care for his health and maintain his physical condition while carrying on his college course.

The equipment consists of the Alumni Athletic Field, which has room for two football fields, a quarter-mile cinder track with a 220 straightaway, and the baseball diamond; and also the old field for class football and baseball, two tennis courts, and the drill hall floor for basket ball. For several years the drill hall floor was used for class work in gymnastics, but its condition has become so bad that this has been discontinued. During the winter months a hockey rink is provided on the college pond.

[All undergraduate male students are given a physical examination upon entering.]

MEN.

Required Courses.

1. **I. HYGIENE.** — Freshmen. Lectures on personal hygiene.
1 class hour. Credit, 1.
Professor HICKS.
2. **I. RECREATION.** — Freshmen. Outdoor games.
2 laboratory hours, credit, 2.
The DEPARTMENT.
3. **III. RECREATION.** — Freshmen. Outdoor games.
2 laboratory hours, credit, 2.
The DEPARTMENT.
7. **I. 8. II. 9. III. RECREATION.** — Military substitute for freshman men.
3 1-hour laboratory periods, credit, 3.
The DEPARTMENT.
25. **I. RECREATION.** — Sophomores. Outdoor games.
2 laboratory hours, credit, 2.
The DEPARTMENT.
26. **III. RECREATION.** — Sophomores. Outdoor games.
2 laboratory hours, credit, 2.
The DEPARTMENT.
30. **I. 31. II. 32. III. RECREATION.** — Military substitute for sophomore men.
3 1-hour laboratory periods, credit, 3.
The DEPARTMENT.

Elective Course.

77. **III. TRAINING COURSE.** — Seniors. Election by permission only. History of physical education and supervision of athletics.
1 class hour. Credit, 1.
Professor HICKS.

WOMEN.

Required Courses.

4. **I. RECREATION.** — Freshmen. Outdoor games.
3 laboratory hours, credit, 3.
Mrs. HICKS.

5. **II. GYMNASTICS.** — Freshmen. Dancing, Swedish games, etc.
3 laboratory hours, credit, 3.
Mrs. HICKS.
6. **III. RECREATION.** — Freshmen. Outdoor games.
3 laboratory hours, credit, 3.
Mrs. HICKS.
27. **I. RECREATION.** — Sophomores. Outdoor games.
3 laboratory hours, credit, 3.
Mrs. HICKS.
28. **II. GYMNASTICS.** — Sophomores. Dancing, Swedish games, etc.
3 laboratory hours, credit, 3.
Mrs. HICKS.
29. **III. RECREATION.** — Sophomores. Outdoor games.
3 laboratory hours, credit, 3.
Mrs. HICKS.
- Elective Courses.*
50. **II. GYMNASTICS.** — Juniors. Dancing, Swedish games, etc.
3 laboratory hours, credit, 1.
Mrs. HICKS.
76. **II. GYMNASTICS.** — Seniors. Dancing, Swedish games, etc.
3 laboratory hours, credit, 1.
Mrs. HICKS.

THE LIBRARY.

The general college library consists of all books belonging to the college, including the library of the Experiment Station and all divisional and departmental collections of books. The main collection now occupies the entire building, which was originally intended to serve the purposes of both chapel and library. A dictionary card catalogue is intended ultimately to cover all material in the general college library, which now comprises approximately 70,000 volumes, besides much unbound or paper-bound material, pamphlets, periodicals and newspapers. The library contains also some important special collections of books, amounting to several thousand volumes, not yet catalogued. Much of the constantly increasing pamphlet and periodical material, even though it is not yet comprehended in the general catalogue, is made promptly available by means of check lists, indexes, bibliographies and other library helps. Files of important periodicals make readily accessible to readers the latest contributions to the sum of human knowledge by contemporary leaders in many fields of thought and investigation. Works dealing with the sciences related to the processes and problems of agriculture are in greatest abundance, but literature, history and sociology are also well represented in our collections of books. The reading room is well supplied with encyclopedias and other general reference books, and with current numbers of an attractive list of popular and technical magazines and periodicals.

The greater part of the library material has been recently reclassified and recatalogued in accordance with a standard system, and is thereby rendered at all times directly accessible to teachers and students as well as library workers. From time to time informal lectures on the use of the library will be given to groups of students. By seminar and laboratory methods, individual students will be taught to appreciate books as essential sources of information and culture, and will be instructed in the use of the various devices common in libraries for finding what the library contains. All members of the college community have the privilege of free access to the book stacks for reference purposes, and books not specially reserved may be loaned for extra-library use for a period of two weeks.

The library is open from 8 A.M. to 9.30 P.M. on week days, and from 9 A.M. to 1.30 P.M. on Sundays while college is in session. Shorter hours prevail during vacation.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., LL.D., President of the College.

CHARLES E. MARSHALL, Ph.D., Director of the Graduate School and Professor of Microbiology.

GRADUATE STAFF, 1923-24.

President BUTTERFIELD, Dean LEWIS, Director MARSHALL, Professors ANDERSON, BEAUMONT, CANCE, CHAMBERLAIN, CLARK, CRAMPTON, FERNALD, GRAHAM, ITANO, LINDSEY, OSMUN, PETERS, PHELAN, SEARS, SHAW, THAYER, TORREY, WAUGH, WELLES; Mr. WATTS, Secretary.

This college has provided study of a graduate nature for many years. The need for such training became real when agriculture was recognized as an aggregate of the many sciences involved and the many practices employed. The obsolete notion that agriculture is only farming has been replaced by the notion that farming, as such, is only one element in agriculture. The ramifications and divisions of agriculture are many; most of these call for advanced study and training to meet the exigencies of the times. No apology is, therefore, required for an attempt to fathom the scientific, economic and social intricacies of such a fundamental phase of human effort as agriculture. The value of such an undertaking is, or should be, patent to every intelligent mind familiar with the situation.

Graduate work has been available to students since 1893. At that time it was possible to qualify for the degree of master of science; later, in 1898, for the degree of doctor of philosophy; in 1913, for the professional degrees of master of agriculture and doctor of agriculture; in 1916, for the specific professional degree of master of landscape architecture.

To make the graduate work more effective and distinctive in agriculture, the graduate school was established in 1908. It has become the operating agency for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment station specialists in farm management, dairying, live stock husbandry, poultry science, agronomy, landscape gardening, pomology, vegetable gardening and floriculture; for positions as bacteriologists, botanists, chemists, entomologists; for economists and social workers; and for numerous other positions requiring a great amount of scientific and professional agricultural knowledge, training and experience.

ORGANIZATION.

The school is based upon the department as the unit, and the apprenticeship system as the most effective means of instruction. This gives to the student individuality in treatment and an intimacy with actual conditions of work and operations. The student is assigned to an advisory committee, composed of the instructor in charge of his major subject as chairman, and instructors in charge of his minor subjects as members, which directs his graduate studies. The chairmen of all these committees together constitute the graduate staff, which controls the policy of the graduate school.

ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

NATURE, METHODS AND REQUIREMENTS OF GRADUATE WORK.

Graduate work differs from undergraduate work in its purposes and methods. The primary aims of the instructor are emphasized in an attempt to have the student adjust himself and place himself in his environment; develop the rule of self-direction and self-instruction; acquire the power of accurate reasoning; gain proficiency and skill in his selected field of study or practice; and obtain an appreciative and discriminative insight into experimentation and original research. Methods are not devised, therefore, for attractiveness, entertainment and superficial reviews, but for the creation of initiative and profound thought, thorough acquaintance with detail, independent advance and industrious habits. Careful readings, lectures, conferences, surveys, laboratory exercises and field work are some of the agencies utilized.

All members of the graduate school are required to attend the course of lectures designed to supplement the technical work of all graduate studies. These lectures will be given once each week, and the students will be held responsible for the work.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major and the others as minors. No two of these subjects may be taken in the same department. An original thesis shall be considered a part of the major subject.

Candidates for the degree of doctor of agriculture are required to select a major and such other subjects as will develop the major in its greatest intensity and comprehensiveness. Successful experience is also requisite, together with a thesis which represents a masterly survey or intimate study through accurate application of some phase of the major subject.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as a major and the other as a minor. These subjects may not be selected in the same department. An original thesis is considered a part of the major subject.

Candidates for the degree of master of agriculture are allowed greater privileges in the selection of subjects, but will be required to select a major and such other supporting lines of study as will be necessary to equip the individual professionally.

Candidates for the degree of master of landscape architecture will be expected to conform to the established courses of the department, and to the requirements of the department in the preparation of a thesis, as well as in actual experience outside the college.

Candidates for membership in the graduate school who do not desire to work for a degree may, with the approval of the director of the school, take more than one subject in the same department, or pursue work in several departments, if their preparation will permit. A statement of the subjects chosen must in each case be submitted to the director of the graduate school for approval. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

The graduate staff reserves the privilege of recommending and allowing courses in other institutions as a part of residence instruction. Such supervision will be exercised and credit granted as are essential to the highest standards of efficiency.

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject; must show that its writer possesses the ability to carry on constructive study; must be an actual contribution to knowledge; and possess real merit.

The thesis in its final form must be submitted to the director by May 15 of the year in which the student is to present himself for the advanced degree, and before he may take the required examination. Three complete copies are required. One of the copies is to be retained as an official copy by the director, one is to be deposited in the college library, and the third is to be retained by the department in which the thesis was prepared. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in his thesis.

FINAL EXAMINATIONS.

For the degree of doctor of philosophy or doctor of agriculture, final examinations on the minors taken are given upon the completion of the subjects. In the major subject a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

For the degree of master of science, master of agriculture or master of landscape architecture, a final examination upon the minor taken is given upon the completion of each course, and in the major a final examination, which may be either written or oral, or both, is given over all the work by the department concerned.

DEGREES CONFERRED.

The degrees of doctor of philosophy and doctor of agriculture are conferred upon graduate students who have met the following requirements:—

1. The devotion of at least three years¹ to the prosecution of three subjects of study and research in residence at the college.

¹ All time statements refer to minimum time.

2. The earning of not less than one hundred credits in the chief or major subject, and of not less than twenty-five credits in each of two minor subjects.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge and accompanied by drawings if necessary. For the degree of doctor of agriculture the thesis may be modified to meet professional requirements.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the instructors in charge.

5. A public oral examination.

6. The payment of all fees and college expenses required.

The fee for the degree of master of science, master of agriculture, or master of landscape architecture is \$10, and for the degree of doctor of philosophy or doctor of agriculture, \$25.

The degrees of master of science, master of agriculture and master of landscape architecture are conferred upon graduate students who have met the following requirements:—

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence. In the case of a master of landscape architecture the student must follow the prescribed course of study.

2. The earning of not less than fifty credits in the chief or major subject, and of not less than twenty-five credits in the minor subject. Students pursuing the course in landscape architecture will devote all of their time to the established course, and meet the conditions of one year of experience outside the college.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

COURSES OFFERED.

Courses available as major subjects for the degree of doctor of philosophy:—

Agricultural Economics.
Botany.
Chemistry.
Entomology.

Horticulture.
Microbiology.
Rural Sociology.

Courses available as major subjects for the degree of master of science:—

Agricultural Economics.
Agricultural Education.
Agriculture.
Agronomy.
Animal Husbandry.
Botany.
Chemistry.

Entomology.
Horticulture.
Mathematics and Physics.
Microbiology.
Poultry Science.
Rural Sociology.
Veterinary Science.

Courses available as major subjects for the degree of master of agriculture:—

Agronomy.

Animal Husbandry.

Poultry Science.

The course in Landscape Architecture leads to the degree of master of landscape architecture.

Courses available as minor subjects:—

Agricultural Economics.
Agricultural Education.
Agriculture.
Agronomy.
Animal Husbandry.
Animal Pathology.
Botany.
Chemistry.

Entomology.
Horticulture.
Landscape Architecture.
Mathematics and Physics.
Microbiology.
Poultry Science.
Rural Sociology.
Zoology.

GENERAL OUTLINE OF COURSES FOR ADVANCED DEGREES.

Agricultural Economics.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK.—Candidates must have had the following courses or their equivalents: Economics and Sociology 51, Agricultural Economics 26 and 50.

REQUIRED WORK.—Candidates must take the following courses: Agricultural Economics 51, 52, 53 and 79. These courses, specially arranged for graduates, may be taken as Courses 120, 170, 155 and 180 for graduate credit. In addition, candidates must take Courses 110, 111, 130, 165 and 175 in Agricultural Economics; Rural Sociology 27 and 50, or equivalent courses; and Economics and Sociology 50 and 77, or equivalent courses.

Each candidate will be required to have a working knowledge of the general field of economics, the history of agricultural economics, the theory of agricultural economics, the problems of agricultural production, land tenure, land problems, agricultural commerce, agricultural co-operation, agricultural credit, statistics of agriculture, and prices, markets and marketing.

For the Degree of Master of Science.

PREREQUISITE WORK.—The same as for the degree of doctor of philosophy.

REQUIRED WORK.—The same as for the degree of doctor of philosophy, except that there is no language requirement.

GRADUATE COURSES OFFERED.

110. **THEORY OF AGRICULTURAL ECONOMICS.**—Readings in French, German and English on economics of agriculture. Alternate years, odd, 200 hours. Credits, 3.
Professor CANCE.

111. **CURRENT ECONOMIC PROBLEMS AND LITERATURE.**—Department seminar throughout the year. Credit, 1 each term.

120. **HISTORICAL AND COMPARATIVE AGRICULTURE.**—General survey. May be taken in connection with Course 51. Spring term, yearly. Credits, 3.
Assistant Professor SAWTELLE.

121-122. **HISTORY OF AMERICAN AGRICULTURE.**—Special studies in the history of agricultural institutions, practices or relations. Fall Term, even years. Credits, 5.
Assistant Professor JEFFERSON.

130. **PROBLEMS OF AGRICULTURAL PRODUCTION.**—The relation of the farmer to the food supply. May be taken in connection with Course 77. Fall term, yearly. Credits, 5.
Professor CANCE.

140. LAND TENURE AND THE ACQUISITION OF FARM LAND. — Readings, discussion, original exercises. Alternate years, even. Credits, 3-5.
Professor CANCE.
145. FARM LABOR. — Reading and investigation. Credits, 3.
Professor CANCE.
150. AGRICULTURAL COMMERCE, INDUSTRY AND TRADE. — A study of trade movements and commercial activities relating to agricultural products. Fall term, alternate years, odd. Credits, 3-5.
Assistant Professor JEFFERSON.
155. THE AGRICULTURAL MARKET. — A study of the forces, methods and institutions of the market for agricultural products. Spring term, yearly. Credits, 5.
Professor CANCE.
156. SPECIFIC PROBLEMS IN MARKETING FARM PRODUCTS. — Reports and discussions. Alternate years, odd. Credits, 3.
Professor CANCE.
160. AGRICULTURAL PRICES. — Winter term, yearly. Credits, 3.
Assistant Professor SAWTELLE.
161. AGRICULTURAL PRICES. — Spring term, yearly. Credits, 3.
Assistant Professor SAWTELLE.
165. TRANSPORTATION OF AGRICULTURAL PRODUCTS. — Elementary discussion and report. Winter term, yearly. Credits, 5.
Professor CANCE.
166. SPECIFIC TRANSPORTATION PROBLEMS. — Original study, reading and report on certain transportation problems related to agriculture. Alternate years, odd. Credits, 3-5.
Assistant Professor SAWTELLE.
170. CO-OPERATION IN AGRICULTURE. — Elementary problems and discussion. May be taken in connection with Course 50. Winter term, yearly. Credits, 5.
Professor CANCE.
- 171-172. SPECIAL PROBLEMS IN CO-OPERATION FOR ECONOMIC PURPOSES. — Study, original investigation and discussion. Every third year, beginning 1922. Credits, 3-5.
Professor CANCE.
175. AGRICULTURAL CREDIT. — Readings and reports in addition to class lectures on agricultural credit. Taken in connection with Course 78. Spring term, yearly. Credits, 3-5.
Assistant Professor SAWTELLE.
180. ELEMENTARY PRINCIPLES OF STATISTICS. — Chiefly related to agriculture. Lectures, laboratory studies and original work. Taken in connection with Course 79. Fall term, yearly. Credits, 5.
Assistant Professor SAWTELLE.
181. SPECIFIC PROBLEMS IN STATISTICS OF AGRICULTURE. — Alternate years, even. Credits, 3-5.
Assistant Professor SAWTELLE.

185. RURAL LAW. — Corresponds to Course 78. Spring term, yearly. Credits, 5.
Mr. SMART.

186. STUDIES IN AGRICULTURAL LEGISLATION. Credits, 3-5.
The DEPARTMENT.

190-195. INVESTIGATION OF VARIOUS PROBLEMS RELATED TO AGRICULTURAL ECONOMICS. — Credit given on basis of time spent and reports submitted.

200. THESIS. — Research work in agricultural economics will be developed by four principal methods, namely, historical, statistical, accounting and general field investigation. In all instances mastery of research methods includes facility in investigation, tabulation and interpretation of results.

Agricultural Education.

MAJOR REQUIREMENTS.

For the Degree of Master of Science.

PREREQUISITE WORK. — A minimum of 25 undergraduate credits distributed among the following lines of study: philosophy, psychology, history of education, principles and methods of teaching, school organization and administration. Graduates of other than agricultural colleges who wish to take their major work in some phase of rural education will be required to present evidence of a knowledge of rural life and rural industries both scientific and practical. This may involve the study of some undergraduate courses in agriculture or horticulture without graduate credit.

REQUIRED WORK. — In addition to the regular prescribed work at least a half year of experience in teaching or supervision is required before the candidate is recommended for a degree.

GRADUATE COURSES OFFERED.

100. HISTORY OF AGRICULTURAL EDUCATION. Credits, 1-10.
Professor WELLES.

105. PRINCIPLES AND METHODS OF TEACHING AGRICULTURE AND AGRICULTURAL SCIENCE. Credits, 1-20.
Professor WELLES.

110. RURAL EDUCATION: ITS ORGANIZATION AND ADMINISTRATION. Credits, 1-20.
Professor WELLES.

115. SUPERVISION AND ADMINISTRATION OF AGRICULTURAL EDUCATION. Credits, 1-5.
Professor WELLES.

120. THEORY OF VOCATIONAL EDUCATION. Credits, 1-10.
Professor WELLES.

125. PREPARATION OF TEACHERS OF AGRICULTURE. Credits, 1-10.
Professor WELLES.

130. GENERAL EDUCATIONAL THEORY AND PRACTICE. Credits, 1-15.
Professor WELLES.

135. EDUCATIONAL LITERATURE. Credits, 1-10.
Professor WELLES.

140. EDUCATIONAL RESEARCH.

Credits, 1-10.
Professor WELLES.

200. THESIS.

Credits, 25.
Professor WELLES.

MINOR REQUIREMENTS.

Minor work is offered in this department for the degrees of doctor of philosophy and master of science. Candidates must have had the equivalent of 15 undergraduate credits in agricultural education, 5 of which must have been in the history of education.

Agronomy.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidates must have had undergraduate courses 25 and 27 as described in this catalogue, and should have had thorough training in the elements of the natural sciences.

REQUIRED WORK. — Studies will be assigned from the courses listed below. Thesis problems may be chosen in the subject matter of soils, fertilizers or field crops.

For the Degree of Master of Science.

PREREQUISITE WORK. — As above.

REQUIRED WORK. — Assigned work will be selected from the courses listed below.

GRADUATE COURSES OFFERED.

151. FIELD CROP PRODUCTION. — (a) Varieties. Classification; adaptation to climatic and soil conditions, etc.

(b) Distribution as affected by natural and economic conditions.

(c) Cultural methods. Early and late planting of the potato seed crop, of silage corn; spacing of plants; keeping qualities as affected by time and methods of harvesting; tillage and moisture control, etc.

(d) Storage of cereals, roots and tubers as affected by aeration, temperature, humidity, previous treatment, etc.

Credits, 1-25.

175. SOIL TECHNOLOGY. — Soil Physics. Textural relationships of soil classes; absorption phenomena; physical properties in relation to mineralogical and chemical properties; soil structure; moisture relationships; the colloidal conditions of soils, etc.

Credits, 1-25.

177. SOIL FERTILITY. — (a) Soil Chemistry. Nitrogen fertilization, including commercial supply and gain or loss under different systems of soil management; absorption of potash and phosphoric acid; sulfur fertilization; soil acidity, etc.

(b) Soil Biology. Fixation of nitrogen by symbiotic and nonsymbiotic organisms; changes of green and animal manures in the soil; ammonification and nitrification; care and preservation of manures; humus in relation to soil fertility, etc.

Credits, 1-25.

178. CROP IMPROVEMENT. — Involves the application of the principles of plant breeding to special crops.

Credits, 1-25.

200. THESIS.

Credits, 15-25.

MINOR REQUIREMENTS.

Prerequisites are as stated above for major work. In addition, studies suited to the needs of the candidate will be selected from the above courses.

Animal Husbandry.**MAJOR REQUIREMENTS.***For the Degree of Master of Science or Master of Agriculture.*

PREREQUISITE WORK. — Candidate must have had the following courses, or their equivalents, before he can enter graduate work in this department: Animal Husbandry 25, 26, 50, 51, 52, 53, 75 and 78. He should also be able to show evidence of experience in practical animal husbandry.

REQUIRED WORK. — At least 50 credits must be earned from the following list of courses offered by the department.

GRADUATE COURSES OFFERED.

100. HISTORICAL STUDIES OF BREED DEVELOPMENT.	Credits, 5-20.
110. ANIMAL NUTRITION.	Credits, 5-20.
120. PROBLEMS IN ANIMAL FEEDING.	Credits, 5-20.
130. ANIMAL GENETICS.	Credits, 5-20.
140. PROBLEMS IN ANIMAL BREEDING.	Credits, 5-20.
200. THESIS.	Credits, 15-25.

MINOR REQUIREMENTS.

Minor work in animal husbandry may include undergraduate Courses 50, 51, 53, 81 or 82, and such other work in reading and compilation of material as the instructor may outline. Written examinations will be conducted at the completion of each term's work.

Animal Pathology.**MINOR REQUIREMENTS.**

Minor work in animal pathology for the degrees of doctor of philosophy and master of science consists of an especially planned course for graduate students. This is not an undergraduate course, but is arranged to meet the needs of graduate students who have not pursued a course in general pathology. It will continue throughout the year and include reviews in gross and microscopic anatomy, physiological, bacteriological, serological, biochemical and morbid anatomical phases of pathology. Written examinations will be given at the end of each term.

100. GENERAL PATHOLOGY. — As described above, fall term.	Credits, 5.
120. GENERAL PATHOLOGY. — Continuation of 100, winter term.	Credits, 5.
140. GENERAL PATHOLOGY. — Continuation of 120, spring term.	Credits, 5.
160. BIOCHEMICAL PHASES OF PATHOLOGY. — Second year, fall term.	Credits, 5.
180. PATHOLOGICAL HISTOLOGY. — Second year, winter term.	Credits, 5.

Professor GAGE.

Botany.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — The equivalent of certain undergraduate courses, determined by the department in the case of each student, is prerequisite.

REQUIRED WORK. — Candidates will be required to take Courses 100 through 107, and 180, 190, and 200. Courses 150 through 155 may be taken for graduate credit in certain cases. The maximum number of major credits which may be earned in this way is thirty-two.

For the Degree of Master of Science.

PREREQUISITE WORK. — The requirements are the same as for the degree of doctor of philosophy.

REQUIRED WORK. — Candidates will take Courses 100 and 101 and all courses from 102 through 107 which are given during their term of residence, also 180, 190 and 200. In certain cases Courses 150 through 155 may be taken, but not more than 20 credits may be earned in this way.

GRADUATE COURSES OFFERED.

Courses 100 through 106 are lecture courses. They are given in rotation, except Courses 100 and 101, which come every year.

100. PLANT PHYSIOLOGY. — The lectures will consider, under the nutrition of the plant: its chemical structure, absorption of various nutrient substances and their changes in the plant, assimilation and dissimilation of carbon and nitrogen by autotrophic and heterotrophic plants; under changes in the form of plants; growth and form under constant external factors, the influence of variable external and inner factors on growth, form and development; and under plant movements; the various tropisms, nutations, etc. Supplemental demonstrations, laboratory work and readings in the standard texts and journals. One lecture a week for 36 weeks. Credits, 3.

101. PLANT PATHOLOGY. — A general consideration of the history, nature and causes of plant disease; parasitism, predisposition, immunity, degeneration, natural and artificial infection, dissemination, epidemics, biologic strains, monstrosities and malformations, proliferation, prevention and control, economics of plant diseases. One lecture a week for 36 weeks. Credits, 3.

102. PLANT INHERITANCE. — This course is planned to give the student a comprehensive understanding of the principles and facts of plant inheritance. A study is made of plant variations, Mendel's law of heredity, the physical basis of heredity as established by chromosome behavior, pure lines, mutations, species and graft hybrids, etc. One lecture a week for 12 weeks. Credit, 1.

103. BIOLOGIC RELATIONS. — Consideration of certain phases of the morphological and physiological adaptations of plants with regard to insect visit; the rôle of thorns, hairs, tendrils, glands, etc. Various experiments are made to test out experimentally some of the existing theories concerning biologic adaptations. One lecture a week for 12 weeks. Credit, 1.

104. THE ECOLOGY OF PLANTS. — This course deals with the water, light and temperature relations of plants, and the various adaptations in response to these

factors; the various types of plant formation; the migration of plants; the competition of plants; invasion and successions of plants under varied conditions; and the various types of alternations and zonations. One lecture a week for 12 weeks. Credit, 1.

105. **PHYSIOLOGICAL PLANT PATHOLOGY.** — This course considers those plant diseases not due to bacterial or fungous parasites, but resulting from unfavorable physical or chemical conditions of the soil; from harmful atmospheric influences, such as too dry air, too much moisture, hail, wind, lightning, frost; from injurious gases and liquids; from lack of or too much light; from wounds. A knowledge of the normal physiology of the plant is required. Demonstrations and laboratory work will be given, together with assigned readings. One lecture a week for 12 weeks. Credit, 1.

106. **HISTORY OF BOTANY.** — A historical survey of the science; lives of noted botanists; history of certain culture plants, such as wheat, corn, coffee, potato, rice, and their influence on civilization; reading. One lecture a week for 24 weeks. Credits, 2.

107. **METHODS IN DRAWING AND PHOTOGRAPHING FOR THESIS AND PUBLICATION.** — Twelve weeks. Credits, 1-3.

108. **THE COMPARATIVE ANATOMY OF GREEN PLANTS.** — In the lectures an intensive study is directed to the comparative anatomy of green plants from the evolutionary standpoint. Particular emphasis is laid upon the woody forms both living and extinct. Of the latter, the department is fortunate in possessing excellent sets of micro-preparations and lantern slides. Two lectures and one laboratory period for 24 weeks. Credits, 6.

150. **SYSTEMATIC MYCOLOGY.** — See undergraduate Courses 52-54.

151. **SYSTEMATIC BOTANY OF THE HIGHER PLANTS.** — See undergraduate Courses 58 and 59.

152. **PLANT HISTOLOGY.** — See undergraduate Courses 55 and 56.

153. **CYTOLOGY AND EMBRYOLOGY.** — See undergraduate Courses 82 and 83.

154. **PLANT PATHOLOGY.** — See undergraduate Courses 75-77.

155. **PLANT PHYSIOLOGY.** — See undergraduate Courses 78-80.

180. **SEMINAR.** — A weekly seminar for members of the department staff, graduate students and major senior students is held, at which important botanical papers are discussed. Attendance and participation are required. Credits, 3.

190. **COLLATERAL READING.** — Extensive reading of botanical literature in English, German and French, designed to give the student a broad knowledge of the science, is required of all major students. Final examinations are based in part upon this reading course. Credits, 5-10.

200. **THESIS.** — Each major student is required to select a problem in plant pathology or physiology (in other branches at the discretion of the department) for original investigation, and the thesis must embody a distinct contribution to knowledge. An effort will be made to assign problems having some bearing on scientific and economic agriculture. The thesis work counts for not more than 50 per cent of the total number of major credits required for either degree.

MINOR REQUIREMENTS.

For a minor a student may take such of the work offered by the department as seems best suited to his major course. Courses 150 and 155 are primarily undergraduate work which may be taken for minor credit toward advanced degrees. In most cases no problem will be assigned.

Professors OSMUN, ANDERSON, CLARK, TORREY and DAVIS.

Chemistry.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — The candidate must have taken undergraduate Courses 1 to 87, or their equivalent.

REQUIRED WORK. — The candidate will be required to take all the graduate courses listed below. He may also be required to spend at least two terms or one semester at some other recognized institution, pursuing graduate study in chemistry. For the final examinations, questions will be selected from the entire field of chemistry, with special emphasis upon the lines of work covered by the research.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as that required for the degree of doctor of philosophy.

REQUIRED WORK. — The candidate will be required to take Courses 101 and 108 through 114. In addition he will pursue the requirements of one of the following thesis subjects: —

Organic and Biochemistry. — Course 200 and either 105, 106 or 107, and 3 credits for one term selected from Courses 103 (b) or (f), and 104.

Analytical and Industrial Agricultural Chemistry. — Courses 200, 103 (3 credits), and 3 credits for one term selected from Courses 102 and 104 through 107.

Physical Chemistry. — Courses 200, 104, and 3 credits for one term selected from Courses 102, 103 and 105 through 107.

Agricultural Chemistry. — Courses 200, 103 (3 credits), and 3 credits for one term selected from Courses 102 and 104 through 107.

The candidate must pass a final written and oral examination before the department upon undergraduate Courses 1 through 80, as well as upon all graduate work taken in chemistry.

GRADUATE COURSES OFFERED.

101. INORGANIC PREPARATIONS. — Laboratory. The preparation of chemical products from raw materials. The manufacture and testing of pure chemicals. The laboratory work is essentially synthetic in nature, and is designed to aid in acquiring a more adequate knowledge of inorganic chemistry than is to be obtained by chemical analysis alone. Ten to fifteen of the preparations given in Biltz's "Laboratory Methods of Inorganic Preparations" will be made by each student. Any term. Credits, 3.
Assistant Professor SEREX.

102. ADVANCED INORGANIC PREPARATIONS. — Laboratory. Continuation of Course 101. Any term. Credits, 3.
Assistant Professor SEREX.

103. ADVANCED ANALYTICAL CHEMISTRY. — Laboratory. This course may be taken in part as follows: (a) electrolytic analysis, 3 credits; (b) ultimate analysis, 3 credits;

(c) special analytical work to meet the needs of the individual student, 3 credits. In addition, parts of undergraduate Courses 62, 76 and 77 may be taken, as follows: (d) fertilizers, 3 credits; (e) insecticides, 3 credits; (f) milk and butter, 3 credits. (a), (b), (c) may be taken any time; (d), (e), (f) must be taken at the time the undergraduate course is given.

Professor PETERS.

104. ADVANCED PHYSICAL CHEMISTRY. — Laboratory. Measurement of the electrical conductivity of solutions; degree of ionization; ionization constants; per cent hydrolysis of aniline hydrochloride from conductivity measurements; solubility product by the conductivity method; velocity of saponification by conductivity; neutralization point by conductivity; vapor pressure determinations; critical temperature of carbon dioxide or sulphur dioxide; transport numbers; preparation and properties of colloidal solutions; transition points by dilatometric method; heat of solution of ammonium chloride and potassium nitrate; adsorption of iodine by charcoal; splitting of racemic glyceric or racemic tartaric acid into its optical components. To each student separate work will be assigned. Any term.

Credits, 3.

Assistant Professor SEREX.

105. ADVANCED ORGANIC PREPARATIONS. — Laboratory. The preparation of compounds not included in Courses 51 and 52, such as the Kolbe synthesis of salicylic acid; benzophenone and Beckmann's rearrangement; rosaniline, malachite green, Congo red, indigo and other dyes; synthesis of fructose; Grignard reaction. Barnett, Cain & Thorpe, Gattermann, Noyes, Fischer and other laboratory guides are used. To each student separate work will be assigned. Any term.

Credits, 3.

Professor CHAMBERLAIN.

106. ADVANCED BIOCHEMISTRY. — Laboratory. The hydrolysis of proteins and isolation of the amino acids; the study of milk, blood and urine; dietary and digestion studies. References: Abderhalden, Plimmer, Salkowski, Hawk, etc. To each student separate work will be assigned. Any term.

Credits, 3.

Professor CHAMBERLAIN.

107. INDUSTRIAL ORGANIC CHEMISTRY. — Laboratory. The preparation, on a large scale, of wood alcohol, acetic acid, ethyl alcohol, benzene and cellulose products, such as mercerized cotton and artificial silk. References: Molinari, Rodgers & Aubert, Thorpe, Enzyklopädie der tech. Chemie, etc. To each student separate work will be assigned. Any term.

Credits, 3.

Professor CHAMBERLAIN.

108. THEORETICAL CHEMISTRY. — Lectures. The following topics are considered: the compressibility of the atoms; the structure of atoms; the electron conception of valence. First term. Alternates with Course 109.

Credit, 1.

Professor PETERS.

109. ANALYTICAL CHEMISTRY. — Lectures. A general survey of methods and technique covering processes commonly carried out in the laboratory. Gooch's "Quantitative Analysis" is used as a text. First term. Alternates with Course 108. Credit, 1.

Professor PETERS.

110. ORGANIC CHEMISTRY. — Lectures. Some of the following topics will be considered both theoretically and industrially: alkaloids, synthetic dyes, essential oils, terpenes, rubber, etc.; the study of methods for carrying out general reactions;

isomerism, tautomerism, condensation, etc. References: Cain & Thorpe, Cohen, chemical monographs, Lassar-Cohn, Heinrichs, Molinari. Second term. Alternates with Course 111.

Credit, 1.

Professor CHAMBERLAIN.

111. BIOCHEMISTRY. — Lectures. Some of the following topics will be considered both chemically and physiologically: fats, cholesterol, lecithin, carbohydrates, amino acids, proteins, urea, uric acid, purine bases, enzymes, fermentation, animal food and nutrition, photosynthesis. References: Monographs on biochemistry, Abderhalden, Plimmer, Haas & Hill, Lewkowitsch, Fischer, Euler, Mathews, Czapek. Second term. Alternates with Course 110.

Credit, 1.

Professor CHAMBERLAIN.

112. THEORETICAL AND PHYSICAL CHEMISTRY. — Lectures. The relation between the constitution and properties of compounds; mutarotation; steric hindrances; stereoisomerism of other elements than carbon; molecular association; similarity between the compounds of silicon and carbon. Third term. Alternates with Course 113.

Credit, 1.

Assistant Professor SEREX.

113. THEORETICAL AND PHYSICAL CHEMISTRY. — Lectures. Radioactivity; the application of physical chemistry to industrial chemistry. Third term. Alternates with Course 112.

Credit, 1.

Assistant Professor SEREX.

114. SEMINAR. — Conferences, reports or lectures. Three terms, twice a month.

Credit, $\frac{1}{2}$.

Professor LINDSEY.

200. THESIS. — Research, and, in the case of a degree, the preparation of an acceptable thesis in agricultural, analytical, organic or physical chemistry, under the direction of the professor in charge of the work, provided that a candidate for the degree of doctor of philosophy shall have had the equivalent of Courses 51, 52, 65 and 86. Credit determined by work done.

MINOR REQUIREMENTS.

Work may be selected from any of the undergraduate Courses 27 and 51 to 80, or any of the graduate courses for which the student is prepared provided that any candidate for the degree of doctor of philosophy, who is taking chemistry as a minor, shall have had the equivalent of Courses 5, 52, 65 and 86. In addition, the candidate may be required to pass a final written and oral examination before the department upon his entire minor work.

Entomology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Students must have had all the undergraduate courses given at this college or their equivalent. Opportunities to make up any deficiencies will be available while the graduate work is being carried on.

REQUIRED WORK. — The graduate courses consist of lectures on all, and laboratory work on a part, of the subjects given below, together with advanced readings, seminar work and original research.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — A major course for the master of science degree will be about half of the courses listed below.

GRADUATE COURSES OFFERED.

100. MORPHOLOGY. — 1. Embryonic development of insects and polyembryony.
2. Metamorphosis and its interpretations.
3. Advanced external and internal anatomy.
4. Insect histology.
5. Ancestry and development of insects, including fossil insects.
6. Hermaphrodites in insects.
7. Hybrids.
8. Parthenogenesis, pedogenesis and heterogeny.
9. Chemistry and physics of insect colors.
10. Color patterns, their significance and value.
11. Luminosity.
12. Deformities.
13. Variation in insects.

120. ECOLOGY. — 1. Dimorphism and polymorphism.
2. Mimicry, including concealment, protective devices and warning coloration.
3. Architecture of insect structures.
4. Relation of insects to plant fertilization and its importance.
5. Insect products of value to man.
6. Geographical distribution and methods of distribution of insects, with a consideration of life zones, barriers, etc.
7. Insect migrations.
8. Insect behavior and experimental entomology.
9. Enemies of insects.

140. ECONOMIC ENTOMOLOGY. — 1. Control methods.
2. Insect photography and methods of preparing illustrations.
3. Field work and life history investigations with methods for keeping records.
4. Legislation about insects.
5. Studies of insecticides and their application.

160. SYSTEMATIC ENTOMOLOGY. — 1. History of entomology and of classifications.
2. Lives and works of prominent entomologists.
3. Abundance of insects.
4. Important collections, public and private; their location and their value.
5. Types of insects; their significance, importance and location.
6. Rules of nomenclature and how they are used.
7. Methods for collecting, preparing, preserving and shipping insects.

180. SEMINAR. — Readings and reports on the current literature of entomology; monthly meetings.
190. COLLATERAL READINGS. — The best articles on the various topics in entomology are assigned for collateral readings, and are included in the final examinations.
200. THESIS. — Original research on one or several topics in morphology, ecology, economic and systematic entomology. This is expected to require from one-half to three-quarters of the total working time of the student.

MINOR REQUIREMENTS.

Minor courses will cover such parts of the work outlined above as will be most likely to prove useful in connection with the majors taken by the students, or in their future work. It is not required that such men shall have had all the undergraduate work in entomology given at this college, their credit for a minor beginning where their own undergraduate training in the subject ended.

Horticulture.

Graduate work is offered in various lines of horticulture. For the most part this is divided into the different departments which constitute the college Division of Horticulture, as follows: pomology, floriculture, landscape gardening, forestry and market gardening. For work in these lines application should be made direct to the heads of the several departments.

Besides this work, however, opportunity is offered for graduate study in general horticulture, including topics from the several organized departments mentioned, and also questions relating to plant breeding, general evolution, propagation, manufacture of horticultural products, etc. This general work is under the direction of Professor Waugh, head of the Division of Horticulture.

Landscape Architecture.

MAJOR REQUIREMENTS.

For the Degree of Master of Landscape Architecture.

PREREQUISITE WORK. — The undergraduate courses in the college known as Landscape Gardening 50, 51 and 52, Drawing 25, 26 and 27, Horticulture 27, 50 and 51, and Mathematics 26 and 27 will be considered prerequisite to graduate work, and any student who has not passed these courses, or their equivalent, will be required to make up such work without graduate credit.

REQUIRED WORK. — Each student before he may receive the master's degree with a major in this department must convince his instructors that he has a genuine aptitude for some branch of landscape gardening, either in design, construction or management.

The minimum period of graduate study will be one and one-half years. At least one year of this time must be spent in residence at the college. One year must also be spent in practice outside the college. The work done outside the college may be prescribed by the department, and must be fully reported to the department in writing. It is essential, further, that the candidate secure the written approval of his employers outside the college. The department may, at its discretion, require a longer period of study at the college or a longer apprenticeship outside the college.

Every student before receiving his master's degree in landscape architecture, must have given some thorough and fruitful study to each of the following five departments. As far as possible these studies must be of a practical nature, *i.e.*, they must be made upon actual projects in progress of development.

1. *Theory.* — The principles of esthetics as applied to landscape architecture.

2. *Design.* — The principles of pure design and their application in landscape and garden planning.

3. *Construction.* — The practical methods of carrying out landscape plans, laying out, equipment, organization of working force, time and cost keeping, etc.

4. *Maintenance.* — Methods, organization, cost.

5. *Practice.* — Office work, drafting, estimating, reporting, charges, accounting.

While great freedom is allowed to graduate students in their plans of work, a certain portion of time will always be given to systematic courses of instruction. Courses

known as Landscape Gardening 175, 176, 177, 178, 179, 180, 181 and 182 are required, and may or may not be accepted for graduate credit, at the discretion of the department.

GRADUATE COURSES OFFERED.

175. THEORY OF LANDSCAPE ART. — Same as Landscape Gardening 75. First term. Credits, 3.
Professor WAUGH.
176. CIVIC ART. — Same as Landscape Gardening 76. Second term. Credits, 4.
Professor WAUGH.
177. COUNTRY PLANNING. — Same as Landscape Gardening 77. Third term. Credits, 4.
Professor WAUGH.
178. ARCHITECTURE. — Same as Landscape Gardening 78. Third term. Given in alternate years. Credits, 3.
Assistant Professor HARRISON.
179. CONSTRUCTION. — Same as Landscape Gardening 79. Third term. Given in alternate years. Credits, 3.
Assistant Professor HARRISON.
180. THEORY OF DESIGN. — Same as Landscape Gardening 80. First term. Credits, 4.
Professor WAUGH.
181. ESTATE DESIGN. — Same as Landscape Gardening 81. Second term. Credits, 4.
Assistant Professor HARRISON.
182. PARK DESIGN. — Same as Landscape Gardening 82. Third term. Credits, 4.
Assistant Professor HARRISON.
190. THEORY. — Special studies. Credits, 2-10.
The DEPARTMENT.
191. DESIGN. — Individual problems by arrangement. Credits, 2-10.
The DEPARTMENT.
192. CONSTRUCTION. — Individual problems by arrangement. Credits, 2-10.
The DEPARTMENT.
193. MAINTENANCE. — Special studies, experimental work or assigned problems. Credits, 2-10.
The DEPARTMENT.
194. PRACTICE. — Professional field work under supervision. By arrangement. Credits, 2-10.
The DEPARTMENT.
195. SEMINAR. Credits, 1-5.
Professor WAUGH.

200. **THESIS.** — Each student before receiving the master's degree with a major in landscape architecture must present a satisfactory thesis or complete project. A thesis will consist of a careful original study of some problem in landscape architecture, presented in typewritten form with any necessary illustrations, such as photographs, diagrams, drawings, etc. A project will consist of a completed set of studies of some suitable landscape-gardening problem, such as the design of a park, a real estate subdivision, an extensive playground. Such a project will usually consist of —

- (a) Original surveys, including topography.
- (b) Block plans, showing original design.
- (c) A rendered plan or plans of the main features.
- (d) Detailed working drawings.
- (e) Estimates of cost.
- (f) Complete report and letter of transmittal.

Credits, 5–20.

MINOR REQUIREMENTS.

Any student electing a minor in landscape architecture will be directed to take such courses from the regular catalogue list as may seem most suitable to him. Under ordinary circumstances no other work will be given to students electing minors. In special cases, however, individual problems will be assigned and individual instruction given. These exceptions will be made in cases where, by so doing, it is possible to give the student material assistance in the plan of his major work.

Microbiology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidate must have had Courses 50, 51, 52, 80, 81, 82 and 83, or their equivalents, before he can enter upon graduate work.

REQUIRED WORK. — Studies will be selected from the courses offered below. It will be the purpose of the department to distribute such studies among the courses offered in a manner to gain the greatest efficiency and a comprehensive knowledge of the entire field. The work will be conducted by prescribed readings, critical written reviews, conferences, lectures and laboratory exercises.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — Courses of a basic and applied character selected from the courses offered below which will prepare the student for effective effort.

GRADUATE COURSES OFFERED.

- | | |
|---|----------------|
| 100. HISTORY OF MICROBIOLOGY. | Credits, 5–10. |
| 110. CYTOLOGICAL AND MORPHOLOGICAL STUDIES AND CORRESPONDING TECHNIQUE. | Credits, 5–10. |
| 120. STUDIES IN TECHNIQUE AND METHODS. | Credits, 5–20. |
| 130. PHYSIOLOGICAL STUDIES. | Credits, 5–20. |
| 135. INDUSTRIAL FERMENTATIONS. | Credits, 5–10. |
| 140. AGRICULTURAL MICROBIOLOGY — GENERAL SURVEY. | Credits, 5–20. |

141. MICROBIAL STUDIES IN AGRICULTURE.	Credits, 5-10.
150. SOIL MICROBIOLOGY.	Credits, 5-20.
160. DAIRY MICROBIOLOGY.	Credits, 5-20.
170. FOOD MICROBIOLOGY.	Credits, 5-20.
180. HYGIENIC MICROBIOLOGY.	Credits, 5-20.
181. SPECIAL SANITARY OR HYGIENIC STUDIES.	Credits, 5-10.
190. LECTURES AND STUDY OF LITERATURE.	Credit, 1 each term.
200. THESIS. — Some microbiological problem related to agriculture or food. Distributed as may be most beneficial for research work. Time and credit by arrangement. Credits, 15-50.	

MINOR REQUIREMENTS.

Minor work in microbiology may consist of undergraduate Courses 50, 51, 52, and other courses designed to support the major work, from among the courses offered above. The candidate will also be required to pursue graduate Course 190, or follow a course of reading and conferences through three terms. In case the candidate has had some of these courses, he will be required to take more advanced substitute courses.

Pomology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidates must have had the equivalent of the courses required for graduation from this college; also sufficient practical experience to enable them to understand and appreciate the problems of orchard practice.

REQUIRED WORK. — The work outlined below will be required of all candidates.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — One-half of the work outlined below, selected to meet the needs of the individual student, will be required.

GRADUATE COURSES OFFERED.

101. EXPERIMENTAL METHODS. Credits, 15-20.

A critical study of the methods of research that have been used or may be helpful in pomological work. The following topics will be considered from the point of view of the investigator in pomology.

1. Statistical methods.
2. Measures of growth and yield.
3. The conduct of plot experiments.
4. Methods of soil study in their relation to pomological research.
5. Chemical methods of pomological research.
6. Methods of physiology applicable to fruit plants.
7. Microchemistry.

102. POMOLOGICAL RESEARCH.

Credits, 15-20.

A critical survey of past and current research work in pomology. Semi-weekly meetings for reports and discussions will be held. The following topics will be taken up.

1. Orchard soil management.
2. Soil fertility and fertilizers.
3. Physiology of pruning tree fruits and bush and vine fruits.
4. Fruit bud differentiation.
5. Sterility and fertility.
6. Genetics of fruit plants.
7. Climatology and winter injury.
8. Advanced morphology.
9. Spraying machinery and equipment.
10. Special practices.

103. ADVANCED LABORATORY WORK.

Credits, 5-12.

Each student will be required to become familiar with the research work of the department and to have a share in it. So far as this has value as graduate work he will receive credit.

104. HISTORY OF POMOLOGY.

Credits, 2-5.

The men, institutions and other influences that have contributed to the development of the science and art of pomology.

105. HORTICULTURAL TAXONOMY.

Credits, 2-3.

A study of the history and development of plant classification with special reference to horticultural plants. A study of modern classification carries with it an expression of opinion as to the evolution of cultivated plants.

106. ADVANCED SYSTEMATIC POMOLOGY.

Credits, 6-10.

The principles of systematic pomology including a study of nut and subtropical fruits not usually dealt with in undergraduate courses.

200. THESIS.

Credits, 40-50.

Each student will be required to carry out an original investigation of an assigned problem. In the planning, executing and interpreting the data of this problem he must show marked ability. The results are embodied in a thesis to be passed upon by the Department and the Graduate Staff.

MINOR REQUIREMENTS.

Students taking a minor in pomology will select such of the above courses as may be suited to their needs. Certain advanced undergraduate courses may also be taken for minor credit.

Poultry Science.**MAJOR REQUIREMENTS.**

For the Degree of Master of Science or Master of Agriculture.

PREREQUISITE WORK. — The postgraduate course presupposes all under-graduate work or its equivalent, together with practical experience. Without the latter, students will be unable to handle Courses 140, 150 and 160. At the discretion of the instructor in charge, graduate students may be required to pursue undergraduate courses in other departments without credit.

REQUIRED WORK. — All the courses listed below. Practical poultry work may be required, but no credit will be given for such work.

GRADUATE COURSES OFFERED.

101. READING. — A review of the entire field of poultry literature, covering books, bulletins and special articles, is made, and a written report on one or more subjects required.

110. SEMINAR. — A critical review and a criticism of the more important experiments carried on at various stations in this and other countries; also a study of poultry conditions in foreign countries, methods of management, etc., besides a detailed study of some of the largest poultry projects in this country.

120. ANATOMY (GROSS AND HISTOLOGICAL), PHYSIOLOGY AND SURGERY. — This course requires a careful study of the anatomy and physiology of the fowl. Special attention is given to a study of those structures concerned with practical poultry problems. Instruction in surgical technique, adapted to fowls, may also be given.

130. BREEDING. — The student will carry on such breeding experiments as time and facilities permit. He may also do work in connection with our regular experimental projects. A detailed study of the pertinent literature will be required. Animal Husbandry 5, or its equivalent, is a prerequisite.

140. FEEDING. — A study of the relation of various foods and other substances to the morphology and physiology of the bird, with special reference to such subjects as egg production, feather form and structure, condition of flesh, bone, etc.

150. BROODING. — Studies will be made upon the relation between viability and rate of growth and the following topics: type of brooder, number of chicks in brood, ventilation, humidity, sanitation, exercise and weather conditions; also a comparison of natural methods with artificial methods of rearing chicks.

160. INCUBATION AND EMBRYOLOGY. — A number of problems of a practical, scientific and mechanical nature relating to incubation are considered. The work in embryology is of an advanced nature, dealing with its relation to morphogenesis and heredity, and presupposes an elementary knowledge of the embryology of the chick.

170. POULTRY DISEASES AND SANITATION. — In this course a study is made of various problems in poultry sanitation, with particular reference to methods relating to the control and eradication of disease.

200. THESIS.

MINOR REQUIREMENTS.

Courses 101 and 110 are designed particularly for minors.

Rural Sociology.

MAJOR REQUIREMENTS.

For the Degree of Doctor of Philosophy.

PREREQUISITE WORK. — Candidates must present satisfactory evidence of having completed at least 10 credit hours in general sociology and 10 credit hours in general economics; or take such undergraduate courses as the department may designate to satisfy this requirement.

REQUIRED WORK. — Candidates must take or pass by satisfactory examination courses offered by the department for undergraduates bearing the numbers 26, 50,

51, 52 and 75, and such courses in agricultural education and agricultural economics as may be required, not to exceed 10 credit hours in each department. Candidates will be required to select from the courses listed below as graduate courses a field for investigation and intensive study. Candidates for the doctorate must take all courses listed as graduate.

For the Degree of Master of Science.

PREREQUISITE WORK. — The same as for the degree of doctor of philosophy.

REQUIRED WORK. — Not less than 50 credit hours will be required from the courses listed below. The department will make such selection as may best meet the interest of the individual student.

GRADUATE COURSES OFFERED.

177. FIELD WORK OF AN INVESTIGATIONAL NATURE.

178. RURAL SOCIAL SURVEYS.

179-181. SEMINAR.

182. SOCIAL CONDITIONS OF AMERICAN RURAL LIFE.

183. SOCIAL CONDITIONS OF EUROPEAN RURAL LIFE.

184. RURAL INSTITUTIONS.

185. RURAL ORGANIZATION.

186. FARMERS' ORGANIZATIONS.

187. TOWN AND VILLAGE RURAL LIFE.

188. RURAL HEALTH AND SANITATION.

189. RURAL LITERATURE.

190. RURAL GOVERNMENT AND LAW.

200. THESIS.

Veterinary Science.

Work is available in hygiene, veterinary pathology, and other special lines or divisions of the subject.

Zoölogy.

MINOR REQUIREMENTS.

Courses in zoölogy may be available as a minor for the degrees of doctor of philosophy and master of science. The nature of the work will necessarily vary according to circumstances, and may be intensive in a special field and correlated closely with the major work of the student, or it may be of a more general character, depending on the student's needs or previous acquaintance with general zoölogical science.

THE SHORT COURSES.

The short courses offered by the Massachusetts Agricultural College are designed to meet the needs of those, both young and old, who cannot come to the college for the regular college courses. They furnish the student with instruction in modern accepted methods, and are planned to help the farmer and the housewife.

The short courses include:—

- A. The Two-year Course in Practical Agriculture.
- B. The Ten Weeks' Winter School.
- C. The Summer School.
- D. The Vocational Poultry Course.

REQUIREMENTS FOR ADMISSION TO SHORT COURSES.—Students must be at least seventeen years of age, and must furnish satisfactory evidence of good moral character. References are required. There are no entrance examinations. The sole test is ability to do the prescribed work. Students enrolling for the Two-year Course in Practical Agriculture must have at least a common school education.

EXPENSES OF SHORT COURSES.—The expense of attending any of the short courses is approximately as follows:—

Furnished rooms in private houses (per week)	\$3 to \$5
Board at college dining hall (per week)	\$7
Board with private families (per week)	\$6.50 to \$9
Registration fee (Ten Weeks' Winter School)	\$5

Tuition in all the short courses is free to residents of the Commonwealth. Small laboratory fees are charged in some of the courses.

A. TWO-YEAR COURSE IN PRACTICAL AGRICULTURE.

The Two-year Course in Practical Agriculture is offered to meet the needs of students who for one reason or another cannot take the four-year college course. It is designed to provide a large amount of practical information and training in agriculture and horticulture.

It will appeal, not only to young men and women, but also to men and women of mature years and practical experience who wish to know more about the business of farming. Although the course is planned to meet the needs of those who are not graduates of high schools, the instruction is not preparatory or elementary in its nature, but is so planned that it will be of value to all. The greater amount of academic training that some of the students may possess will in a measure be offset by the fund of practical knowledge possessed by many who have completed only the elementary schools.

The course is not intended for students enrolled in high schools. Such students should finish the high school course. Students enrolled in high schools who wish to take the course should bring a statement either from the principal of the high school or from parent or guardian asking permission to be enrolled.

The Two-year Course in Practical Agriculture is arranged so as to provide specific

vocational training for the particular lines of agricultural work which the students may select. When a student enrolls he is required to state the type of farming in which he expects to engage; and to select from the following courses of study the one he wishes to pursue: —

1. General agriculture, with animal husbandry as the principal subject.
2. General agriculture, with poultry as the principal subject.
3. Dairy manufactures.
4. General horticulture.
5. Pomology.
6. Floriculture.
7. Vegetable gardening.

He then pursues a specially arranged course of preparation for that type of work. This specialization does not prevent his securing a general working knowledge of other subjects in which he may be interested.

The advantages of the college staff of specialists and the college plant with all its resources are thus made available to young men and young women who may not have had the opportunity of securing a high school education.

The first year consists of six months of study at the college. The term begins with the college fall term and closes with the winter term of the regular session. The same vacation periods are observed as in the regular four-year course.

At the close of six months of study, students are required to gain six months of farm experience. The college will assist students in finding positions and in placing them on farms where the experience gained will be of great advantage. Thus an effort will be made to place on a dairy farm the man expecting to take up dairying as his chief line of work, and a student of pomology on a fruit farm.

During the second year the student spends nine months in resident study, completing the subject pursued in the first year.

Each student is required to file with the treasurer of the college a statement, signed by the town (or city) clerk of the town (or city) from which he enrolls, stating that the parent or guardian of the student is a resident of that town.

CERTIFICATE. — All students will receive a certificate showing their standings in courses in which they were registered. Credits earned in the Two-year Course in Practical Agriculture or in any other of the short courses do not lead to the college degree. Students who possess college entrance requirements and who wish to take the regular college work should address the registrar of the college.

TUITION. — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$60 a term.

B. THE WINTER SCHOOL.

The Winter School, beginning usually about January 1 and continuing for ten weeks, was started several years ago, and has always been very popular, not only with more mature farmers and their wives, but with young men and women who control or manage farms. The courses, though short, are very practical in their nature, and are so arranged that a student may choose such subjects as will enable him to specialize along the line of work in which he is most interested. There is a wide range in the choice of subjects, making it possible for the student to take work for several winters in succession. Many college graduates enroll for the Winter School.

SCHOLARSHIPS. — The Jewish Agricultural and Industrial Aid Society of New York has instituted a system of free scholarships to enable the children of Jewish farmers to attend the short winter course in the States in which they reside. The stipend is sufficient to pay all the expenses of the holder for the course. Such expenses usually amount to from \$100 to \$150. The following courses are offered: —

OUTLINE OF THE TEN WEEKS' WINTER SCHOOL, JANUARY 2 TO MARCH 7.

Soil Fertility. Three lectures a week.
 Field Crops. Two lectures and one two-hour laboratory period per week.
 Types and Breeds of Livestock. Three lectures and two two-hour laboratory periods a week.
 Livestock Feeding. Three lectures per week.
 Animal Breeding. One lecture and one two-hour laboratory period per week.
 Dairying. Five lectures and five laboratory periods per week.
 Dairy Bacteriology. Two lectures and one two-hour laboratory period per week.
 Animal Diseases and Stable Sanitation. Two lectures per week.
 Poultry Husbandry. Five lectures and one two-hour laboratory period per week.
 Fruit Growing. Three lectures and one two-hour laboratory period per week.
 Market Gardening. Three lectures and two two-hour laboratory periods per week.
 Floriculture. Five lectures per week.
 Horticultural Manufactures. Two lectures and two laboratory periods per week.
 Farm Management. Two lectures a week.
 Farm Accounts. Two two-hour laboratory periods per week.
 Marketing. Two lectures a week.
 Agricultural Credit. Two lectures a week.
 Botany. Two lectures a week.
 Entomology. Three lectures per week.
 Farm Structures. Two lectures and one two-hour laboratory period per week.
 Farm Machinery. Two lectures and three two-hour laboratory periods a week.
 Rural Sanitary Science and Hygiene. Two lectures per week.
 Vocational Guidance. One lecture per week.
 Foods. One lecture and two two-hour laboratory periods per week.
 The Business of the Household. Three class hours per week.
 Home Care of the Sick. Three class hours per week.
 Principles and Methods of Vocational Agricultural Teaching. Five exercises per week.
 Special Methods in Vocational Agricultural Teaching. Five exercises per week.
 Professional Improvement Problems. Five periods per week.

C. THE SUMMER SCHOOL.

The summer school has been maintained by the college for a number of years. The experience of these years has been a value in arranging short, intensive, practical courses that will meet the needs of teachers, home makers and professional workers, who wish instruction in agriculture, agricultural education and home economics, and who can most conveniently come to the college during the summer. The instruction is given by the regular members of the college staff, assisted by outside lecturers. In previous years the term has been four weeks.

The nature of the work of the summer school is indicated by the following typical program: —

Agriculture and Horticulture: —

Poultry husbandry.
 Fruit growing.
 Flower growing.
 Vegetable gardening.
 Food preservation.
 Beekeeping.

Home economics: —

Foods and nutrition.
 Preparation and serving of meals.
 Garment making.
 Dress design and construction.
 Millinery.
 House furnishing.
 Home management.

Related subjects: —

Insect life.
 Bird life.
 Recreation.
 Dramatic presentation.
 Design and practical arts.
 Rural sociology.
 Hygiene and sanitation.

Agricultural education: —

Principles and methods of teaching.
 Special methods in vocational agricultural teaching.
 Professional improvement problems.
 Supervision and administration of agricultural education.
 Vocational education.

D. ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY.

PURPOSE. — This course is designed for graduates of the agricultural vocational schools and others who wish to prepare themselves for practical poultry keeping, and can spend only one year at college.

SCOPE. — The work covers seven detailed courses in poultry husbandry, as well as short-course work in fruit growing, market gardening, animal husbandry, or other subjects that will be helpful to poultry raisers. In addition to classroom and laboratory exercises each student is required to put in from twenty-five to thirty hours per week at the plant in the care and management of poultry, for the purpose of becoming proficient in the various branches of the work.

ENTRANCE REQUIREMENTS. — Applicants must be at least eighteen years of age and have a good elementary education.

FEES. — There is no tuition for residents of Massachusetts, but a laboratory fee of \$5 is required for both the fall and spring terms.

NOTE. — The course is limited to sixteen students. The One-year Poultry Course begins in December and continues until the following December.

Due to a strong demand for the course, it was necessary to start a second class in vocational poultry at the beginning of the winter term. Thirty students were enrolled in both classes of vocational poultry.

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

Student Expenses.

TUITION.¹ — Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$180 a year. Students entering from Massachusetts are required to file with the president a statement signed by either town or city clerk stating that the applicant's father is a legal resident of Massachusetts.

All students entering the college for the first time as undergraduates or two-year students are charged a matriculation fee of \$5, which in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the diploma.

DORMITORIES AND BOARD. — The college has dormitory accommodations for about 62 men students. The rooms in the dormitories are occupied by the upper classmen, hence new students find it necessary to room in private houses. The rooms in the college dormitories are unfurnished; for the most part they are arranged in suites of three, — one study room and two bedrooms. These rooms are heated by steam and lighted by electricity; they are cared for by students occupying them. The dormitory rent for each person varies from \$39 to \$66 a year. The rent for furnished rooms in private houses ranges from \$1 to \$4 a week for each occupant. Correspondence in regard to rooms should be addressed to the dean of the college.

Board may be obtained at the college dining hall. At present, the price of board there is \$7 a week.

Expenses.

The necessary college expenses are estimated as follows: —

Tuition: citizens of Massachusetts, free; others, \$180 per year.

	Low.	High.
Matriculation fee, first year	\$5 00	\$5 00
Room in college dormitories or in private houses	39 00	110 00
Board, \$7 per week	45 00	45 00
Laundry, 50 to 85 cents a week	18 00	30 00
Laboratory fees	5 00	25 00
Books, stationery and miscellaneous items	38 00	60 00
	\$350 00	\$475 00

OTHER EXPENSES. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from \$15 to \$30 a year. Additional financial responsibility is also assumed by students joining a fraternity or entering into other social activities of the college. Students rooming in college dormitories are obliged

¹ This statement applies to those registering as regular or two-year students.

to equip their own rooms with furniture. The college assumes no responsibility in regard to the safe keeping of student property either during the college term or vacations, except under such special arrangement as may be made with the treasurer. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$400 and \$500 per year.

INITIAL CHARGES.

At the opening of the college year, before students are registered in their classes, the following charges are payable at the treasurer's office: —

	Freshmen.	Sophomores.	Juniors and Seniors.
Matriculation fee	\$5 00	—	—
Board (if at college dining hall) four weeks in advance	28 00	\$28 00	\$28 00
Assessment for support of Social Union	1 50	1 50	1 50
Laboratory fees	5 00	5 00	2 00-10 00
Room rent (if in college dormitory)	—	—	12 00-20 00
Student tax for support of athletics ¹	5 00	5 00	5 00
Student tax for support of nonathletic activities ¹	3 00	3 00	3 00

¹ While this is not essentially a college charge, the treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers; the amount of athletic tax by vote of the student body.

LABORATORY FEES.

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present, the fees charged are as follows: —

Agronomy: —		Per Term.
Course 27	.	\$2 00
Course 50	.	2 50
Course 51	.	2 50
Course 75	.	2 00
Course 77	.	2 50
Course 78	.	2 50
Animal husbandry: —		
Course 25	.	1 50
Course 26	.	1 50
Course 75	.	1 50
Course 78	.	1 00
Dairying: —		
Course 50	.	3 00
Course 51	.	3 00
Course 75	.	3 00
Course 76	.	3 00
Course 77	.	3 00
Farm management: —		
Course 75	.	1 50
Course 76	.	1 50
Poultry husbandry: —		
Course 51	.	2 50
Course 52	.	3 00
Course 76	.	2 00
Course 77	.	2 00

Rural engineering: —															Per Term.
Course 25	.	.	.	.	.	.	.	.	.	.	.	.	.	.	\$1 50
Course 26	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1 50
Course 75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1 50
Course 78	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1 50
Floriculture: —															
Course 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Course 51	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Course 52	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Course 53	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Course 75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 76	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 77	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Course 55	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Forestry: —															
Course 56	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 57	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 58	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4 00
Landscape gardening: —															
Course 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Course 51	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Course 52	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 50
Course 76	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 77	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 80	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 81	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 82	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Vegetable gardening: —															
Course 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 52	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 53	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 76	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Pomology: —															
Course 54	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4 00
Course 75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4 00
Drawing: —															
Course 25	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 26	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 27	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Botany: —															
Course 3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1 50
Course 25	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1 50
Course 26	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1 50
Course 50	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 51	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 52	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 53	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 54	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2 00
Course 55	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 56	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 75	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 76	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 77	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 78	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 79	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 80	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 82	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00
Course 83	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3 00

Entomology: —

Per Term.

[illegible]

Chemistry: 1 —

[illegible]

Mathematics and engineering:—

[illegible]

Microbiology: —

[illegible]

Physics:—

[illegible]

Veterinary science:—

[illegible]

¹ An additional deposit of \$1 for Courses 1 to 6, inclusive, and \$2 for Courses 25 to 95, will be required to cover individual breakage. In case the laboratory breakage does not equal the deposit, the balance will be refunded.

Zoölogy: —

Per Term.

Course 25	Course 25	\$3 00
Course 26	Course 26	3 00
Course 50	Course 50	3 00
Course 51	Course 51	3 00
Course 52	Course 52	3 00
Course 54	Course 54	2 00
Course 75	Course 75	3 00
Course 76	Course 76	3 00
Course 77	Course 77	3 00
Course 79	Course 79	2 00

Music (each course) 3 00

Rural home life: —

Courses 25, 26, 27	Courses 25, 26, 27	1 50
Courses 50, 51, 52	Courses 50, 51, 52	4 00

Rooms.

Students are expected, as far as possible, to occupy rooms in the college dormitories. Students who do not live in the college dormitories must secure rooms approved by the college. The assignment of rooms, and the general supervision of the housing of students, is in charge of the dean. At the end of each college year all unoccupied rooms will be thrown open for selection, and will be assigned to students according to classes.

Living Accommodations for Women Students.

Women students attending the college live in a dormitory provided for them, and take their meals at Draper Hall, which is located a short distance from the women's dormitory. The women's dormitory accommodates 98 girls, and is furnished. The present charge for room and board for women students is \$120 per term.

Student Aid.

SELF HELP. — Many students are obliged to find work of some sort to earn their way through college. A few men have met their entire expenses in this manner, many more have paid a large part of their expenses, and many have earned a small proportion of the cost of their college education; but the college recommends that no new student enter without having at least \$200 and preferably \$300 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in completing his college course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

So far as possible needy students will be employed in some department of the college. The divisions of agriculture and horticulture usually afford the most work, although there are several permanent janitorships available for students, and forty or more students are employed at the dining hall.

Application for student labor should be made directly to Kenyon L. Butterfield, president of the college. Students whose department or class work is not satisfactory are not likely to be continued in student labor. The most desirable and responsible positions are naturally assigned to those needy students who have been in the institution

longest and who have demonstrated their need and ability. Students, therefore, may find it rather difficult to obtain all the work they desire during their freshman year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last few years the demand for paid labor on the part of new students has far exceeded the amount of employment that the college can offer. The college cannot promise work to any student, particularly to freshmen; it accordingly urges prospective students who are dependent entirely upon their own efforts not to undertake the course before they have earned enough money to carry them through, or nearly through, the first year.

Memorial Hall.

Soon after the close of the World War the alumni, students, faculty and friends of the college subscribed \$150,000 for the erection of a soldier memorial building to be placed on the college campus. This building was completed in the summer of 1921. It is designed to serve as headquarters for the student activities, and as the center of the social life of the institution.

In the basement are bowling alleys, pool tables, a store, post office and barber shop. On the main floor are eight offices for leaders of various student activities, a large reading room, and a beautiful memorial room in which is found the tablet bearing the names of the sons of the college who gave their lives in the great war. On the second floor is an auditorium seating 350 persons. This room is also used for college dances.

Student Accounts.

The following rules are enforced concerning student accounts: —

No student will be allowed to graduate until all bills due the institution from him are paid.

College charges, such as room rent, laboratory fees and tuition, must be paid in advance, at the beginning of each term. This rule is strictly adhered to, and no student will be allowed to complete his registration until such payments are made.

Every student boarding at Draper Hall is required to pay at the beginning of each term at least one month's board in advance; and no student will be allowed to continue to board at Draper Hall if at any time during the term he is more than one week in arrears in his payment for board.

All money due for student labor shall at the discretion of the treasurer of the college be applied on account toward any bills that a student may owe to the institution.

Honor Council.

All tests and examinations are conducted under the honor system, which is administered by an Honor Council chosen by the students. Recommendations for discipline are made to the president of the college by the Honor Council.

Student Relations.

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standards of student deportment.

The privileges of the college may be withdrawn from any student at any time, if such action is deemed advisable.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right, not only to sus-

pend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may also be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences ("cuts"). According to the rules a student is allowed a certain percentage of absences from class and other exercises. This permission, which implies a privilege and not a right, may be withdrawn at any time for any cause.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary.

The college maintains an infirmary for the care of sick or injured students.

The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students:—

MANAGEMENT OF THE INFIRMARY.

Supervision.

1. The infirmary is under the *general supervision* of Prof. Charles E. Marshall, who is designated as Supervisor of the Infirmary. A resident nurse is in *immediate* charge of the infirmary.

Use of Infirmary.

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health.

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee.

4. The infirmary fee will be at the rate of \$2 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out-patients for miscellaneous treatment of a minor character.

Additional Expenses.

5. In addition to the fee charged, as specified in paragraph 4, the following additional expenses will be charged to the patient: —

(a) *Nurses.* — In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(b) *Professional Service.* — If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(c) *Supplies.* — Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(d) *Laundry.* — Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

B. COLLEGE ACTIVITIES.**General Exercises.**

Chapel exercises are held two mornings each week. On Thursdays during the fall term, and on Wednesdays during the winter and spring terms, an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is held during the winter months. Students are required to attend these general exercises, although the president is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities.

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established in 1907. All students become members of the union by paying a small fee. In the fall and winter months the union gives a series of entertainments, free to students and faculty.

The College Senate is composed of representatives of the junior and senior classes. This body serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The Young Men's Christian Association and the Young Women's Christian Association are active both socially and religiously. A Catholic club has also been organized.

Intercollegiate and intermural athletic contests are held throughout the year in the leading sports, including football, baseball, track, hockey and basketball. The athletic board, composed of alumni, faculty and students, has charge of finances, schedules, and general policies governing athletics.

The musical clubs include an orchestra and a glee club. These give a number of concerts, usually followed by dancing, during the year, both in Amherst and on tour. A dramatic club, The Roister Doisters, present annually a revue and two plays, one in connection with the promenade and the other at commencement. There are, besides the declamation and oratorical prize contests, both underclass and intercollegiate debates. The college is a member of a triangular league with Rhode Island and Connecticut. The college publications are the "Massachusetts Collegian," the weekly newspaper; "The Index," the year book; "The Squib," a comic magazine; and "The Alumni Bulletin," issued from the office of the alumni secretary. The Academic Activities Board, composed of alumni, faculty and students, has charge of the finances, schedules, etc., of the various clubs and publications.

A rifle club has been organized for a few years. Teams representing this club have repeatedly won the intercollegiate championship of the country, both in indoor and outdoor contests.

C. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete a four-year course receive the degree of bachelor of science. The fee for graduation from the college is \$5.

Graduate students who complete the assigned courses will receive the degree of master of science upon the payment of a fee of \$10. Credit may sometimes be allowed towards this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-year course of study, and present a satisfactory thesis, will be granted the degree of doctor of philosophy.

Those to whom degrees are awarded must present themselves in person at commencement to receive them. No honorary degrees are conferred.

The honorary fraternity of Phi Kappa Phi has a chapter at the agricultural college. Students are elected to membership to this fraternity on the basis of scholarship. Elections are made from the highest tenth of the senior class who have attained an average grade of at least 85 per cent during their college course.

Prizes.

Prizes are given annually in several departments for excellence in study or for other special achievement. Prizes awarded in 1923 were:—

GRINNELL PRIZES. — The Grinnell prizes, given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture, were awarded as follows:—

First prize, Trescott Tupper Abele.

Second prize, Warren Hannaford Towne.

Third prize, Robert Brooks Bates.

PUBLIC SPEAKING. — The Burnham prizes were awarded to the students delivering the best and second best declamations, as follows:—

First prize, George Lyle Church, 1925.

Second prize, James Batal, 1925.

FLINT PRIZES. — The Flint prizes were awarded to the student delivering the best oration, as follows:—

First prize, Alexander Sandow, 1923.

Second prize, Benjamin Gamzue, 1923.

HILLS PRIZES. — The Hills prizes for the best herbaria were awarded as follows:—

First prize, George Lyle Church, 1925.

Second prize, George Francis Shumway, 1925.

SOUTHERN ALUMNI BASEBALL CUP. — For the best all-round baseball player during the season, of 1922 the Southern Alumni baseball cup was awarded to Howard Reynolds Gordon, 1923.

ALLEN LEON POND MEMORIAL MEDAL, FOR EXCELLENCE IN FOOTBALL. — The Allen Leon Pond memorial medal for general excellence in football was awarded to Wilbur Horace Marshman, 1923. This medal is in memory of Allen Leon Pond of the class of 1920, who died Feb. 26, 1920.

DEGREES CONFERRED — 1923.

MASTER OF SCIENCE (M.Sc.).

Ali, Mehmed, B.A., International College, Smyrna	Smyrna, Asia Minor.
Flikkema, Renzy Evert, A.B., Hope College	Morrison, Ill.
French, Arthur Perkins, B.Sc., Ohio State University	Amherst.
Parker, John Robert, B.Sc., Massachusetts Agricultural College	Bozeman, Montana.
Potter, David, B.Sc., Massachusetts Agricultural College	Concord.
Tietz, Harrison Morton, B.Sc., Massachusetts Agricultural College	Richmond Hill, N. Y.
Tipple, Esther Watson, B.Sc., Teachers College, Columbia University	Valparaiso, Ind.
Worthley, Harlan Noyes, B.Sc., Massachusetts Agricultural College	Amherst.
Yount, Hubert William, B.Sc. in Agr., Ohio State University	Toledo, Ohio.

MASTER OF AGRICULTURE (M.Agr.).

Lowe, Chinghsi Hiram, B.A., Peking University, B.Sc., University of Illinois	Chinwangtao, North China.
Rice, Victor Arthur, B.Sc., North Carolina State College	Amherst.

DOCTOR OF PHILOSOPHY (Ph.D.).

Serex, Paul, Jr., B.Sc., M.Sc., Massachusetts Agricultural College	Amherst.
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BACHELOR OF SCIENCE (B.Sc.).

Abele, Trescott Tupper	Quincy.
Alger, Mason Williams	West Bridgewater.
Arrington, Luther Bailey	Florence.
Baker, Howard	Marshfield.
Bateman, Eleanor Willard	Arlington.
Bates, Howard	Cohasset.
Bates, Robert Brooks	West Springfield.
Beal, James Allen	Abington.
Bennett, James Stanley	South Meriden, Conn.
Boles, Inza Almena	Dorchester.
Brewer, Gardner Hunter	Upton.
Broderick, Lawrence Francis	Hyde Park.
Buckley, Francis Edward	Natick.
Burke, Edmund William	Watertown.
Cohen, Saul	Dorchester.
Collins, Donald Keith	Rockland.
Cook, Frederick Belcher	Niantic, Conn.
Corash, Paul	Worcester.
Dickinson, Lewis Everett, Jr.	Holyoke.
Dowden, Philip Berry	Sandwich.
Faneuf, John Benedict	West Warren.
Fitzpatrick, Leo Joseph	Brockton.
Folsom, Owen Eugene	Roslindale.
Friend, Roger Boynton	Dorchester.
Fuller, Robert Donald	Woburn.
Gamzue, Benjamin	Holyoke.
Gerry, Bertram Irving	Peabody.
Gildemeister, Mary Katherine	Belchertown.
Giles, Clifton Forrest	Newtonville.
Gold, Philip	Lynn.
Gordon, Howard Reynolds	Ipswich.
Graves, George	Granville, Ohio.
Grayson, Raymond Henry	Milford.
Hale, John Stancliff	South Glastonbury, Conn.
Hallett, Melvin Bernard	Rockland.

Harrington, Robert John	Holyoke.
Heath, Allan Jay	Newfane, Vt.
Hilyard, Norman Douglas	Beverly.
Hodsdon, Marshall Sinclair	Melrose Highlands.
Holley, George Gilbert	Fiskdale.
Hollis, Frederick Allen	Charlton.
Hunter, Henry Leander, Jr.	Pleasantville, N. Y.
Irish, Gilbert Henry	Turner, Me.
Johnson, Cleon Bancroft	Ipswich.
Johnson, Eyrle Gray	Mattapan.
Lewis, Molly LeBaron	Jamaica Plain.
Lindskog, Gustaf Elmer Richard	Roxbury.
Luddington, Frank Dennison	Hamden, Conn.
MacCready, Donald Eugene	Elizabeth, N. J.
Marshall, Alexander Borea	Greenwich, Conn.
Marshman, Wilbur Horace	Springfield.
Martin, Frances Barbara	Amherst.
Martin, Robert Fitz-Randolph	Amherst.
Mather, Edna	Amherst.
Minor, John Bacon, Jr., as of the class of 1918	Amherst.
Mohamed, Sageer	India.
Mohor, Robert deSales	Newton Centre.
Mudgett, Vernon Downer	Brookline.
Newell, Richard Carll	West Springfield.
Norcross, Harry Cecil	Brimfield.
Nowers, Donald Gilford	Danvers.
Paddock, Wallace Earl	Worcester.
Picard, Charles Francis	Plymouth.
Richards, Homer Flint	Littleton.
Richardson, Mark Morton	West Brookfield.
Roberts, Arthur William	Hyde Park.
Russell, Charles Francis	Winchendon.
Sandow, Alexander	Pittsfield.
Sargent, Richmond Holmes	Winthrop, Me.
Sears, Fred Grant, Jr.	Dalton.
Sharpe, Charles Gertner	Amherst.
Shea, Thomas Francis	Holyoke.
Shumway, Paul Edward	Greenfield.
Slade, Irving Woodman	Chelsea.
Smith, Jeffrey Poole	West Roxbury.
Snow, Thomas Lathrop	Greenfield.
Tanner, Edwin	Worcester.
Tarr, James Gordon	Gloucester.
Tisdale, Edward Norman	Medfield.
Towne, Carroll Alden	Auburndale.
Towne, Warren Hannaford	Cambridge.
Tumey, Malcomb Edward	Deerfield.
Turner, Dorothy VanHoven	Washington, D. C.
Wendell, Richard Goodwin	Belmont.
Whitaker, Holden	Newton Highlands.
Whittier, John McKey	Brookline.
Williams, Forrest Earl	Sunderland.
Wirth, Conrad Louis	Minneapolis, Minn.
Woodworth, Leverett Stearns	Newton.

REGISTRATION, 1923-24.

AS OF NOVEMBER 1, 1923.

GRADUATE STUDENTS.

Archibald, John G.	Amherst.
B.S.A., Ontario Agricultural College, Toronto University.	
Arrington, Luther B.	Florence.
B.Sc., Massachusetts Agricultural College.	
Avery, Roy C.	Amherst.
B.Sc., Connecticut Agricultural College.	
M.Sc., Massachusetts Agricultural College.	
Bailey, John S.	Amherst.
B.S., Michigan Agricultural College.	
M.S., Iowa State College.	
Baron, H. Marshall	Ottawa, Ontario, Canada.
B.S.A., Ontario Agricultural College, Toronto University.	
Bromley, Stanley W.	Southbridge.
B.Sc., Massachusetts Agricultural College.	
Buchanan, Walter G.	Bernardston.
B.Sc., Massachusetts Agricultural College.	
Campbell, Walter J.	Springfield.
A.B., M.A., Princeton University.	
Cassidy, Morton H.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Chase, Eleanor F.	Amesbury.
B.Sc., Massachusetts Agricultural College.	
Degener, Otto	New York, N. Y.
B.Sc., Massachusetts Agricultural College.	
M.Sc., University of Hawaii, Honolulu.	
Dickinson, Lawrence S.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Doran, William L.	Lexington.
B.Sc., Massachusetts Agricultural College.	
Emery, Herbert M.	Durham, N. H.
B.Sc., Massachusetts Agricultural College.	
Foss, Philip E.	Amherst.
B.S., Bowdoin College.	
Freeborn, Stanley B.	Berkeley, California.
B.Sc., Massachusetts Agricultural College.	
Frellick, Arthur L.	Everett.
P.Sc., Massachusetts Agricultural College.	
Frellick, Ralph S.	Brockton.
B.Sc., Franklin College.	
French, Arthur P.	Amherst.
B.Sc., Ohio State University.	
M.Sc., Massachusetts Agricultural College.	
Garabedian, Hovanes	Smyrna, Asia Minor.
B.A., International College, Smyrna.	
Garvey, Mary E. M.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Gibbard, James, Jr.	Toronto, Ontario, Canada.
B.S.A., Ontario Agricultural College, Toronto University.	
Gilligan, Gerald M.	West Warren.
B.Sc., Massachusetts Agricultural College.	
Hall, Merwin P.	Brookline.
A.B., Amherst College.	

Harris, Roy D.	Amherst.
B.Sc., Middlebury College.	
Hayes, Frank A.	Amherst.
B.Sc., Oklahoma Agricultural and Mechanical College.	
M.A., University of Nebraska.	
Ph.D., Iowa State College.	
Hodgdon, Julia P.	Hannibal, Mo.
B.A., Smith College.	
Johnson, Waldemar C.	Elk Rapids, Mich.
B.Sc., Michigan Agricultural College.	
Jones, Willard P.	Black River Falls, Wis.
B.S., University of Wisconsin.	
Julian, Arthur N.	Amherst.
B.A., Northwestern University.	
Lanphear, Marshall O.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Loring, William R.	Hadley.
B.Sc., Massachusetts Agricultural College.	
Louwsma, Henry	Zeeland, Mich.
A.B., Hope College.	
Mack, Merrill J.	Bangor, Pa.
B.S., Pennsylvania State College.	
Mack, Warren B.	Flicksville, Pa.
Ph.B., LaFayette College.	
B.Sc., Pennsylvania State College.	
Meserve, Charles A.	Livermore Falls, Me.
B.Sc., Massachusetts Institute of Technology.	
Ph.D., University of Erlangen, Bavaria.	
Michels, Charles A.	Amherst.
B.Sc., North Dakota Agricultural College.	
Mooney, Raymond A.	Plattsburg, N. Y.
B.Sc., Massachusetts Agricultural College.	
Morgan, Ezra L.	Columbia, Mo.
A.B., McKendree College.	
M.A., University of Wisconsin.	
Muller, Richard T.	Amherst.
B.S., Cornell University.	
M.S., University of Maine.	
Novitski, Joseph F.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Pendleton, Harlow L.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Pulley, Marion G.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Raleigh, George J.	Amherst.
B.S. in Agr., Kansas State Agricultural College.	
M.S., University of Nebraska.	
Redman, Ralph W.	Amherst.
B.S., University of Maine.	
Reed, James P.	Hadley.
B.S., University of Vermont.	
Rice, Victor A.	Amherst.
B.Sc., North Carolina State College.	
M.Agr., Massachusetts Agricultural College.	
Rikert, Carroll	Mount Hermon.
B.A., Harvard University.	
Robertson, William F.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Rogers, Roland W.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Sanborn, Ruby	Amherst.
A.B., Mt. Holyoke College.	
Sanborn, Joseph R.	North Amherst.
B.Sc., Massachusetts Agricultural College.	
Sanctuary, William C.	Amherst.
B.Sc., Massachusetts Agricultural College.	

Simmons, Kenneth B.	Rowesville, S. C.
B.S., Clemson College.	
Smith, Richard W., Jr.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Snyder, Grant B.	Amherst.
B.S.A., Ontario Agricultural College.	
Steere, Paul L.	Waterbury, Conn.
B.S., Connecticut Agricultural College.	
Thelin, Guy	Amherst.
B.Sc., South Dakota State College.	
Tietz, Harrison M.	Richmond Hill, N. Y.
B.Sc., M.Sc., Massachusetts Agricultural College.	
Van Meter, Ralph A.	Amherst.
B.S., Ohio State University.	
Wallace, Anna M.	Amherst.
A.B., Smith College.	
A.M., Smith College.	
Willard, John D.	Amherst.
B.A., Amherst College.	
Williams, Edward K.	Outremont, Quebec, Can.
P.S.A., Macdonald College, McGill University.	
Williamson, Harold F.	Amherst.
B.S.A., Macdonald College, McGill University.	
Worthley, Harlan N.	Amherst.
B.Sc., M.Sc., Massachusetts Agricultural College.	
Yount, Hubert W.	Amherst.
B.Sc.Agr., Ohio State University.	
Zahir, Alfred	Amritsar, India.
B.A., St. Stephens College, University of Punjab.	
M.A., Columbia University.	

Registered after the Catalogue for 1922 was published.

Bailey, John S.	Lakewood, Ohio.
B.S., Michigan Agricultural College.	
M.S., Iowa State College.	
Burnham, Edwin G.	Springfield.
B.Sc., Massachusetts Agricultural College.	
Cook, Frederick B.	Niantic, Conn.
B.Sc., Massachusetts Agricultural College.	
Friend, Roger B.	Dorchester.
B.Sc., Massachusetts Agricultural College.	
Gray, Thomas D.	Morgantown, W. Va.
B.S., Maryland Agricultural College.	
Lacroix, Donald S.	Byfield.
B.Sc., Massachusetts Agricultural College.	
Lawrence, Robert P.	East Greenwich, R. I.
B.Sc., Massachusetts Agricultural College.	
Pendleton, Harlow L.	Amherst.
B.Sc., Massachusetts Agricultural College.	
Redman, Ralph W.	Amherst.
B.S., University of Maine.	
Rikert, Carroll	Mount Hermon.
B.A., Harvard University.	
Tanner, Edwin	Worcester.
B.Sc., Massachusetts Agricultural College.	
Zahir, Alfred	Amritsar, India.
B.A., St. Stephens College, University of Punjab.	
M.A., Columbia University.	

CLASS OF 1924.

Barrows, Robert Arthur	Quincy	Lambda Chi Alpha.
Bartlett, Frederick Sheldon	Westfield	Sigma Phi Epsilon.
Bartlett, Perry Goodell	Holyoke	Lambda Chi Alpha.
Bartlett, Warren Leslie	Boston	Phi Sigma Kappa.
Belden, Clifford Luce	Bradstreet	Kappa Sigma.
Bike, Edward Louis	Westfield	Sigma Phi Epsilon.

Bittinger, Richard	Northfield	Sunset Avenue, care of Professor Banta.
Bowes, Charles Atwell	Worcester	Q. T. V.
Brunner, Fred, Jr.	Cranbury, N. J.	Phi Sigma Kappa.
Burbeck, Joseph Howard	Peabody	Sigma Phi Epsilon.
Cahalane, Victor Harrison	Charleston, N. H.	Alpha Sigma Phi.
Carpenter, Earle Stanton	Rehoboth	Alpha Sigma Phi.
Chase, Theodore Martin	Livermore Falls, Me.	Phi Sigma Kappa.
Cromack, Earl Augustus	Shelburne Falls	Theta Chi.
Darling, Robert Martin	Cambridge	Q. T. V.
Davis, Howard Halsey	Brockton	Lambda Chi Alpha.
Deuel, Charles Frederick, 2d	Amherst	Q. T. V.
Dimock, Walter Lewis	Oxford	Theta Chi.
Dresser, Allen Lucius	Amherst	Q. T. V.
Elliott, James Alexander	Summit, N. J.	Care of Geo. Cooley, Sunderland.
Emery, George Edward	Marlborough	Sigma Phi Epsilon.
Epps, Martha Belle Scott	Winchendon	Abigail Adams House.
Fenton, John Michael	Amherst	108 Pleasant Street.
Fernald, Leland Hoyt	Arlington	Lambda Chi Alpha.
Flint, Ruth Guild	Allston	Abigail Adams House.
Foley, Mary Joanna	Worcester	Abigail Adams House.
Frost, Sherman Clark	Cambridge	Sigma Phi Epsilon.
Frost, Willard Chamberlain	Milford	Theta Chi.
Gadsby, James Herbert	North Adams	Q. T. V.
Garretson, Alfred Corwin	Bound Brook, N. J.	Phi Sigma Kappa.
Gay, Alfred Fullick	Groton	Theta Chi.
Geiger, Aimée Suzanne	Pepperell	Abigail Adams House.
Goldsmith, Eliot Gray	Brookline	Kappa Sigma.
Goldstein, Joseph	Lynn	14 South College.
Grieve, Alexander Watson	Dorchester	Alpha Gamma Rho.
Gryzwacz, Patrick Louis	Ware	Kappa Gamma Phi.
Haskell, Malcolm Rawson	Amherst	Kappa Sigma.
Hayden, Luther Leonard, Jr.	Brookville	Stockbridge Hall.
Hill, Carroll Victor	Worcester	Lambda Chi Alpha.
Holway, Clarence Warren	Putney, Vt.	Alpha Sigma Phi.
Hubbard, Doris	Newton	Abigail Adams House.
Isaac, Carl Frederick	Brighton	Alpha Gamma Rho.
James, Locke LeBaron	West Bridgewater	Alpha Gamma Rho.
Kane, Edward Anthony	Westfield	Q. T. V.
Keith, Clifford Woodworth	East Providence, R. I.	Theta Chi.
King, Rosewell Howard	Millville	Alpha Sigma Phi.
Labrovitz, Rose Florence	Amherst	11 Amity Street.
Lamb, Frie Franklin	Waban	Theta Chi.
Lane, Wilfred Craig	Fitchburg	Kappa Gamma Phi.
Leland, Allen Sanford	East Bridgewater	Alpha Gamma Rho.
Loring, Kenneth Stockwell	Melrose Highlands	Lambda Chi Alpha.
MacAfee, Norman Hoar	Cambridge	Alpha Gamma Rho.
Morris, Walter Markley	Amherst	44 Triangle Street.
Myrick, Sterling	Longmeadow	Lambda Chi Alpha.
Nelson, Carl Olaf	Gloucester	Alpha Gamma Rho.
Nicoll, Arthur Chester	Quincy	Lambda Chi Alpha.
Norwood, Howard Lester	Boston	101 Butterfield Terrace.
Noyes, Russell	Newton Centre	Theta Chi.
Percival, Gordon Pittinger	Medfield	Alpha Gamma Rho.
Perry, Chauncey Valentine	Waltham	Theta Chi.
Perry, John Tuttle	Waltham	Alpha Sigma Phi.
Pierce, Arthur Edwir	Newtonville	Phi Sigma Kappa.
Porges, Nandor	Hyde Park	13 South College.
Pratt, Wallace Francis	Rockland	Alpha Gamma Rho.
Read, John Gammons	Springfield	3 North College.
Regan, Leon Ashley ¹	Walpole	Alpha Sigma Phi.
Reynolds, Joseph Sagar	Attleboro	Theta Chi.
Rhodes, Winthrop Gordon	Waban	Theta Chi.
Ricker, Chester Sewall	Worcester	Alpha Sigma Phi.

Rowell, Elwyn Joseph	Amherst	44 Triangle Street.
Salman, Kenneth Allen	Needham	Lambda Chi Alpha.
Schaffer, Carlton Hill	Ashfield	Alpha Gamma Rho.
Sellers, Wendell Folsom	Melrose	Alpha Gamma Rho.
Shepard, Harold Henry	Athol	Kappa Epsilon.
Sims, Kenneth Wallace	South Boston	Alpha Gamma Rho.
Smith, Richard Burr	Greenfield	Phi Sigma Kappa.
Steele, Charles Wasser	Marblehead	Lambda Chi Alpha.
Steere, Robert Ernest	Chepachet, R. I.	103 Pleasant Street.
Stevenson, Harold Dudley	Camden, Me.	Alpha Gamma Rho.
Tewhill, Charles James	Florence	Alpha Gamma Rho.
Thornton, Clarence Percy	Pelham	R. F. D. 2.
Varnum, Thomas, Jr.	Lowell	Phi Sigma Kappa.
Walker, Judson Newcombe	Marlborough, N. H.	16 North College.
Waugh, Albert Edmund	Amherst	Kappa Sigma.
Weatherwax, Howard Erle	Greenfield	Theta Chi.
White, Samuel Henry	Orange	Lambda Chi Alpha.
Whitman, Chester Edgerly	Milton, N. H.	Phi Sigma Kappa.
Whitney, Richard Augustine	Brooklyn, N. Y.	Kappa Sigma.
Whitney, Will Alvah	Taunton	3 North College.
Williams, James Lowell	Sunderland	Q. T. V.
Witt, Earl Maynard	Belchertown	Alpha Gamma Rho.
Wood, Ruth Millicent	Hathorne	Abigail Adams House.
Wood, William Wilson	Barre Plains	Theta Chi.
Woodworth, Robert Hugo	Newton	Phi Sigma Kappa.

CLASS OF 1925.

Armstrong, Bradford	Kensington, Md.	The Davenport.
Barnes, Adrian Douglas	South Weymouth	Q. T. V.
Bean, Francis Irving	Bradford	Q. T. V.
Benoit, Helen Anna	Amherst	16 Belchertown Road.
Binner, Roger Stokehill	Amherst	Amherst House.
Bray, Ralph Hastings	Framingham	Sigma Phi Epsilon.
Burhoe, Sumner Othniel	Framingham	42 Lincoln Avenue.
Cahill, Carl Winfield	Newburyport	Kappa Sigma.
Casey, Alice Rita	Fall River	Abigail Adams House.
Cassano, Joseph ¹	Groveland	Q. T. V.
Church, George Lyle	Dorchester	Alpha Gamma Rho.
Cleaves, Leighton Greenwood	Gardner	Phi Sigma Kappa.
Cooke, Robert Gordon	Atlantic	Alpha Sigma Phi.
Corwin, Emil Joseph	East Boston	13 South College.
Crosby, John Samuel	Arlington	Phi Sigma Kappa.
Currier, Leland Little	Marblehead	Alpha Gamma Rho.
Davis, Osborne Ozro	Belchertown	20 South College.
DeVito, Dominick	Roxbury	Kappa Epsilon.
Duffy, Leo Francis	Springfield	Kappa Epsilon.
Ferranti, Edmund Tony	West Bridgewater	Lambda Chi Alpha.
Fish, Donald Otis	Amherst	Kappa Sigma.
Gilbert, Chauncey McLean	North Amherst	North Amherst.
Gleason, Harold Albert	Chester	Phi Sigma Kappa.
Gordon, Solomon	Boston	9 South College.
Grover, Walter Champion	Barnardston	Phi Sigma Kappa.
Guterman, Carl Edward Frederick	Springfield	Kappa Sigma.
Haeussler, Gilbert Julius	Springfield	Kappa Sigma.
Hale, Laurence Newton	South Glastonbury, Conn.	Phi Sigma Kappa.
Hanscomb, George Wilmont	North Attleborough	Lambda Chi Alpha.
Harris, Clarence Albert	Utica, N. Y.	4 Chestnut Street.
Holteen, John Gunnar	Quincy	Kappa Gamma Phi.
Hyde, John Worthington	Amherst	55 Pleasant Street.
Ingraham, Edward Forster	Millis	Sigma Phi Epsilon.
Kakavas, James Christo	Lowell	2 North College.
Keith, Lewis Hayden	Bridgewater	Kappa Sigma.
Kennedy, Lowell Francis	Cambridge	Q. T. V.
Lacey, John Sebastian	Holyoke	13 Elm Street, Holyoke.

¹ Special junior.

Lavallee, Louis Palmer	Worcester	5 Nutting Avenue.
Lord, John Frederic	Methuen	Alpha Sigma Phi.
Love, Andrew Wyllie	Auburn	Alpha Gamma Rho.
Lunt, Samuel Wilde	Cumberland Center, Me.	Kappa Sigma.
Mahoney, Walter Francis	Millville	Alpha Sigma Phi.
Marx, Herbert John	Holyoke	Kappa Epsilon.
McGeoch, Charles Ryerson	Providence, R. I.	Kappa Epsilon.
Meserve, George Donald	Hudson	Lambda Chi Alpha.
Mouradian, Garabed Kevoork	Bridgewater	Q. T. V.
Moxon, David	Holyoke	Kappa Epsilon.
Nelson, Paul Redfield	Holyoke	84 Pleasant Street.
O'Connor, Arthur Maxwell	Amherst	Mount Pleasant.
Oliver, Charles Frank, Jr.	Brockton	Lambda Chi Alpha.
Parker, Donald Llewellyn	North Adams	Sigma Phi Epsilon.
Peirce, Veasey	Dorchester	Phi Sigma Kappa.
Peltier, Xavier Paul	Spencer	Q. T. V.
Poe, Frederick	Havana, Cuba	15 South College.
Root, Frank Edson	Bernardston	Alpha Gamma Rho.
Ross, Charles Frederick	Lee	Sigma Phi Epsilon.
Ross, Donald Ernest	Amherst	19 Woodside Avenue.
Rowley, Harold Frederick	West Wareham	15 Hallock Street.
Samuels, Samuel Bernhard	Holyoke	14 South College.
Sazama, Robert Francis	Northampton	Alpha Sigma Phi.
Sheridan, Irwin Scott	Mansfield	Alpha Gamma Rho.
Shumway, George Francis	Monson	Physics Bldg.
Simpson, Gilbert	Holyoke	8 Allen Street.
Slack, Marion Florence	Allston	Abigail Adams House.
Slowen, William Arnold	Shelburne Falls	Physics Bldg.
Smith, Emily Greenwood	Lee	Abigail Adams House.
Sprague, Dudley deRochemont	Melrose	16 South College.
Taube, Gustave	New York, N. Y.	9 South College.
Taylor, Milton Wight	Chatham	Kappa Sigma.
Templeton, Robert James	Boston	Lambda Chi Alpha.
Ward, Gordon Hugh	Englewood, N. J.	Alpha Gamma Rho.
Whittum, Walter Willard	Springfield	Kappa Gamma Phi.
Wilcox, Stanley Dewey	Springfield	Kappa Gamma Phi.
Woodbury, Samuel Lawrence	Springfield	Alpha Gamma Rho.
Zwisler, Frederick Fisher	Holyoke	Kappa Epsilon.

CLASS OF 1926.

Adams, Kathleen Poland	Worcester	Abigail Adams House.
Albertini, Paul Flanders	Billerica	6 Nutting Avenue.
Anderson, Leslie Clayton	East Bridgewater	Lambda Chi Alpha.
Baker, Francis Everett	Hopkinton	Phi Sigma Kappa.
Baker, Frederic Allen	Springfield	Phi Sigma Kappa.
Barber, Elmer Everett	Jamaica Plain	Kappa Epsilon.
Barnes, Russell Norris	Wallingford, Conn.	Sigma Phi Epsilon.
Bartlett, Herbert Franklin	West Springfield	30 North Prospect St.
Beem, Merrill Adelbert	Woodfords, Me.	46 Pleasant Street.
Block, Harry William	Cambridge	North College.
Bosworth, Marguerite Rose	Holyoke	Abigail Adams House.
Bosworth, Maude Elinor	Holyoke	Abigail Adams House.
Bower, James, Jr.	Holyoke	Kappa Epsilon.
Boyd, Mary Turk	Jacksonville, Fla.	Abigail Adams House.
Brougham, Earl Gordon	Holyoke	12 North College.
Bruorton, Earle Wallace	Reading	Sigma Phi Epsilon.
Buckley, Arthur Vincent	Natick	Kappa Sigma.
Budge, William Karl	Mattapan	7 North College.
Burnham, James Erastus	Springfield	Lambda Chi Alpha.
Burt, Stanley Lyman	Easthampton	Alpha Sigma Phi.
Cassidy, Marion Stewart	Wellesley	Abigail Adams House.
Clark, Charles O'Reilly	Beachmont	Sigma Phi Epsilon.
Collier, William Wellington	Hopedale	83 Pleasant Street.
Cook, Wendell Burnham	Townsend	West Experiment Station.
Cooke, Helen Beatrice	Boston	Care of Professor Yaxis, Sunset Avenue.

Cormier, Francis Joseph ¹	Newtonville	Phi Sigma Kappa.
Couhig, Philip Henry	Beverly	Q. T. V.
Cromack, Aaron Field	Shelburne Falls	M. A. C. Box 110.
Cutler, Samuel	Springfield	13 South College.
Davenport, Preston Julian ²	Shelburne Falls	17 Fearing Street.
Davis, Evelyn Louise	Springfield	Abigail Adams House.
Dean, Lecil Wallace	West Palm Beach, Fla.	15 North College.
Dick, Ernest Albert	Lawrence	7 North College.
Dodge, Eliot Perkins	Beverly	Theta Chi.
Doolittle, Alden Hartwell	Northfield	Aggie Inn.
Douglass, Earle Lawrence	Springfield	15 Phillips Street.
Dow, Philip Norman	Bolton	Care of Mr. Everson.
Drake, Dorothy Madeline	Cambridge	Abigail Adams House.
Ducharme, Lucien Henry	Holyoke	15 North College.
Durkee, Lewis Leland	Beverly	18 Nutting Avenue.
Fessenden, Richard William	Middleborough	84 Pleasant Street.
Fitzgerald, Lillian Alice	Holyoke	Abigail Adams House.
Flynn, Alan Foster	Newton	Kappa Epsilon.
Ford, William Warner	Dalton	Stockbridge Hall.
Fraser, Carl Arthur	Westborough	Theta Chi.
Fraser, Harry Edward	Jamaica Plain	Kappa Sigma.
Fuller, Henry Elliot	Melrose	Alpha Gamma Rho.
Galbraith, Leo Lake	South Hadley	Kappa Gamma Phi.
Gavin, Linus Arthur	Natick	Kappa Sigma.
Goodwin, Frederick Tucker	Westfield	Sigma Phi Epsilon.
Goodwin, Marvin Warren	Reading	12 South College.
Gordon, Samuel Francis	Ipswich	Lambda Chi Alpha.
Goren, Louis	Chelsea	14 South College.
Grant, Theodore James	Auburndale	11 South College.
Grayson, Herbert	Milford	83 Pleasant Street.
Greenwood, Elliott Kelton	Hubbardston	M. A. C. Farmhouse.
Gustafson, Alton Herman	Brockton	10 North College.
Hatch, Harold Curtis ¹	Melrose	17 Kellogg Avenue.
Haynes, Walter Lincoln	Springfield	Phi Sigma Kappa.
Hill, Arthur Blair	Walpole	6 Nutting Avenue.
Holbrook, Lester Morse	New Bedford	Lambda Chi Alpha.
Hollingsworth, Duncalf Wright	Providence, R. I.	66 Pleasant Street.
Horner, David James	Montpelier, Ohio	294 Lincoln Avenue.
Howes, Stanley Edward ¹	Brimfield	18 Cottage Street.
Huke, Barbara Allen	South Hadley Falls	Abigail Adams House.
Jack, Mel in Clifton	Amherst	16 Hallock Street.
Jack, Ronald Augustus	Amherst	16 Hallock Street.
Jameson, Matthew	Everett	Kappa Epsilon.
Jensen, Harold Stery	Westfield	Sigma Phi Epsilon.
Johnson, Philip Gordon	Amherst	West Street.
Jones, Alvah Wesley	Salisbury	Kappa Gamma Phi.
Jones, Lawrence Lakin	Brockton	10 North College.
Kafafian, Sarkis Petros ¹	Armenia	11 North College.
Kelso, George	Reading	Sigma Phi Epsilon.
Lambert, John Ford	Gleasondale	West Experiment Station.
Langshaw, Hatton, Jr.	Fairhaven	6 Nutting Avenue.
Larsinos, George John	Westfield	15 South College.
Leedes, Joseph	Philadelphia, Pa.	14 South College.
Lindskog, Hebert Alf	Roxbury	Kappa Epsilon.
Loud, Emery Shaw	Rockland	Theta Chi.
MacMasters, Majel Margaret	Ashburnham	Abigail Adams House.
Mann, Albert Irving	Dalton	Sigma Phi Epsilon.
McNamara, Charles Henry	Stoughton	Kappa Sigma.
Moberg, Herbert Elof	Brockton	12 South College.
Moran, John	Amherst	45 Northampton Road.
Moriarty, John Edward	Ware	15 South College.
Needham, Basil Arthur	Taunton	Sigma Phi Epsilon.
Nichols, Chester Willard	Natick	32 North Prospect Street.
Nickerson, Elsie Elizabeth	East Boston	Abigail Adams House.

¹ Admitted on probation, entrance record incomplete.² Special sophomore.

Noreross, Roy Ellis	Brimfield	16 South College.
Novick, Leo Altschuler	Amherst	56 Pleasant Street.
Noyes, Eliza Margaret	Greenfield	Abigail Adams House.
Otto, Raymond Herman	Lawrence	Kappa Gamma Phi.
Palmer, Cary Davis	Grafton, Vt.	9 North College.
Pomeroy, Elizabeth Clark	Longmeadow	Abigail Adams House.
Potter, Royal Wesley	Providence, R. I.	Phi Sigma Kappa.
Putnam, Ruth Evelyn	Greenfield	Abigail Adams House.
Rainault, Ernest	Holyoke	Kappa Epsilon.
Reed, Charles Porter	Broekton	Lambda Chi Alpha.
Richards, James Marsh	Springfield	Phi Sigma Kappa.
Richardson, Henry Howe	Millis	7 North College.
Roberts, Verne Edward	Willimantic, Conn.	Kappa Epsilon.
Robinson, Clifton Fairbanks	Newtonville	Q. T. V.
Rowen, Edward Joseph	Westfield	Sigma Phi Epsilon.
Sawyer, Roland Damon, Jr.	Ware	9 North College.
Shea, Margaret Catherine	Holyoke	Abigail Adams House.
Simonds, Henry Erving	Winchester	Lambda Chi Alpha.
Smiley, Ray Guild	Worcester	Alpha Sigma Phi.
Smith, Margaret Park	Taunton	Abigail Adams House.
Smith, Myron Newton ¹	Millbury	13 North College.
Smith, Raymond Ellingwood	Manchester	17 Kellogg Avenue.
Sniffen, Loren Fallow	Westport, Conn.	84 Pleasant Street.
Spooner, Raymond Hildreth	Brimfield	M. A. C. Box 129.
Stevens, Alvin Gay	Needham	Kappa Sigma.
Stopford, William Turner	Fort Leavenworth, Kan.	Theta Chi.
Sullivan, Charles Noyes	Fall River	12 North College.
Sullivan, Donald Clifford	Amherst	25 Gray Street.
Sweetland, Augustus Francis	Stoneham	83 Pleasant Street.
Temple, John Burrington	Shelburne Falls	17 Fearing Street.
Tetreault, Albert Joseph	New Bedford	30 Fearing Street.
Thompson, Gerald Thayer	Shelburne Falls	Theta Chi.
Thurlow, George Harold	West Newbury	Kappa Sigma.
Tripp, Kenneth Bliss	Spencer	Kappa Sigma.
Tucker, Edwin Locke	Baldwinsville	Kappa Gamma Phi.
Tulenko, John	Sunderland	Sunderland.
Turner, Charles Edgar	Springfield	8 Mount Pleasant.
Wade, Windsor Burt	Andover	Kappa Gamma Phi.
Walsh, Philip Baker	Amherst	4 Chestnut Street.
Warren, Francis Walter	Stow	Farmhouse.
Waterbury, Arthur Logan	Medford	21 Fearing Street.
Wheeler, Ellsworth Haines	Bolton	Alpha Gamma Rho.
White, Earl Martin	Abington	Kappa Sigma.
White, Montague	West Hartford, Conn.	Q. T. V.
Wilder, Frank Harris	Sterling Jct.	Phi Sigma Kappa.
Williams, Donald Reed	Northfield	Alpha Sigma Phi.
Williams, James Rufus	Glastonbury, Conn.	Q. T. V.
Worssam, Horace Herbert	Bernardston	Q. T. V.

CLASS OF 1927.

Adams, James Prescott	Medway	3 Netting Avenue.
Ames, Robert Call	Tilton, N. H.	4 Hallock Street.
Amstein, William Gerald	South Deerfield	53 Lincoln Avenue.
Anderson, Andrew Bremer	Hudson	Lambda Chi Alpha.
Ashe, Thomas Edmond	Holyoke	5 North College.
Baker, Philip Woodell	Amherst	124 West Street.
Barney, Laurence Hillman, Jr.	New Bedford	29 North Prospect Street.
Belden, Sanford Oscar ²	Bradstreet	83 Pleasant Street.
Biron, Raphael Alfred	Amesbury	Theta Chi.
Black, Lewis Herbert	Williamsburg	44 Pleasant Street.
Boden, Frank Joseph	North Wilbraham	29 North Prospect Street.
Bond, Kenneth Carlton	Hyannis	6 Nutting Avenue.
Botulinski, Frank John	Boston	6 North College.
Bovarnick, Max	Chelsea	56 Pleasant Street.

¹ Admitted on probation, entrance record incomplete.² Special freshman.

Bray, Frederick Roland	Amherst	5 Hitchcock Street.
Bray, Walter Abner	Amherst	5 Hitchcock Street.
Briggs, Lawrence Elliott	Rockland	53 Lincoln Avenue.
Britton, William Francis	Neponset	17 Pleasant Street.
Brooks, William Henry, 2d	Holyoke	45 Pleasant Street.
Bruce, Frances Clara	Easthampton	Abigail Adams House.
Buckler, Ella Maud ¹	Pittsfield	Abigail Adams House.
Campion, Thomas Joseph	Amherst	83 Pleasant Street.
Chamberlain, Alexander Rodger	Springfield	83 Pleasant Street.
Chmulra, William	Hadley	Hadley.
Clagg, Charles Floyd	Everett	53 Lincoln Avenue.
Cobb, Roger Madison	North Attleborough	15 Hallock Street.
Connell, Edward Anthony	Malden	60 Pleasant Street.
Cooke, Dorothy Mabel	Atlantic	50 Amity Street.
Crooks, Clarence Arthur	North Brookfield	15 Hallock Street.
Cummings, Maurice Andrew	Cambridge	3 McClellan Street.
Daniels, David Watson	Sherborn	83 Pleasant Street.
Davison, Ruth Eugenia	West Springfield	Abigail Adams House.
DeCamp, George Moon	Winchester	84 Pleasant Street.
Difley, Raymond Frederick	Worcester	51 Amity Street.
Dole, William Levi	Medford	18 Nutting Avenue.
Duperrault, Ralph Adolph	Westfield	15 Phillips Street.
Dyer, Lester Mills ²	Stoughton	-
Erickson, Paul Telford ¹	Boston	Care of President Butterfield.
Estes, Wendall Eames	West Duxbury	17 Phillips Street.
Esty, Robert Elliot	Natick	14 North College.
Farwell, Theodore Austin	Turners Falls	83 Pleasant Street.
Field, Rebecca	Montague	Abigail Adams House.
Fish, Laura	Amherst	43 Fearing Street.
Flemings, Frederic James	Sharon	45 Pleasant Street.
Foley, Richard Carol	Portland, Me. . . .	17 Phillips Street.
Galanie, Demetrius Lincoln	Marlborough	7 Phillips Street.
Goldberg, Louis Noah	Wilmington	21 Fearing Street.
Goller, Hilda Margaret	Holyoke	Abigail Adams House.
Goodell, Ruth Edna	Westborough	Abigail Adams House.
Greenaway, James Emerson	Springfield	84 Pleasant Street.
Greenleaf, Margaret Hobart	West Acton	Abigail Adams House.
Griffin, Raymond George	Southwick	15 Phillips Street.
Hamilton, Thomas Arnold	Fair Haven, Vt. . . .	Experiment Station.
Hansen, Niels Jul ¹	Denmark	27 Fearing Street.
Hanson, Daniel Cameron	Dracut	21 Fearing Street.
Harris, Edmund George ¹	Baldwinsville	Kappa Gamma Phi.
Harris, Herbert Joseph	Springfield	84 Pleasant Street.
Hart, Ralph Norwood	Dorchester	Alpha Gamma Rho.
Haskins, Ralph Warner	Greenfield	3 Nutting Avenue.
Hatch, George Franklin, Jr. . . .	West Roxbury	22 Sunset Avenue.
Henneberry, Thomas Vincent	Manchester	8 North College.
Hilyard, Joseph Rayman	Beverly	70 Lincoln Avenue.
Hollinger, Howard Stanley ¹	Springfield	83 Pleasant Street.
Houghton, Allen Ward, Jr. . . .	North Amherst	27 Leverett Street.
Huber, Richard Alden	East Northfield	6 Nutting Avenue.
Hurley, Francis Joseph	Newton Centre	8 Allen Street.
Huthsteiner, Elladora Kathryn	Pittsfield	Abigail Adams House.
Hyde, William Eaton	Amherst	55 Pleasant Street.
Jacoby, Paul Kester	Ashby	30 Fearing Street.
Johnson, Gustaf Arthur	Mount Hermon	44 Pleasant Street.
Kelton, Richard Coolidge	Hubbardston	Farmhouse.
Krassovsky, Leonid Alexander	Russia	116 North Pleasant Street.
Kuzmeski, John William	Amherst	Leverett Street.
Leland, Ralph Chester	East Bridgewater	Farmhouse.
Lenoir, Thomas Benjamin ¹	Greenwood	6 Nutting Avenue.
Levin, Aaron	Malden	-
MacLaren, Edward Wallace	Sutton	Hatch Barn.

¹ Admitted on probation, entrance record incomplete.² Special freshman.

Manter, Nelson Laird	Clinton	7 Nutting Avenue.
Maxwell, Lewis Joseph	Stoneham	81 Pleasant Street.
McAllister, Robert Wright	North Billerica	21 Fearing Street.
McVey, Ernest Gregory	Dorchester	Care of Mr. Everson.
Merlini, Angelo Albert	North Adams	116 Pleasant Street.
Merrill, Winslow Eaton	Wilmington	84 Pleasant Street.
Milligan, Kenneth William	State Line	101 Pleasant Street.
Moore, Howard Cross	Malden	42 McClellan Street.
Morrill, Alfred Clayton	Natick	81 Pleasant Street.
Mullen, Francis Redding	Becket	17 Fearing Street.
Murdough, Edwin Lincoln	Springfield	Davenport.
Nash, Norman Blake	Abington	70 Lincoln Avenue.
Nottebaert, Harry Charles	Lexington	42 McClellan Street.
Parsons, Clarence Howard	North Amherst	North Amherst.
Parsons, Josiah Waite, Jr.	Northampton	83 Pleasant Street.
Partenheimer, Merrill Henry	Greenfield	14 North College.
Patterson, Jane ¹	Amherst	26 Lincoln Avenue.
Patton, William King	Holyoke	1 North College.
Pickens, Herman Eames	Stoneham	81 Pleasant Street.
Powell, Charles Mason	Brookfield	30 Fearing Street.
Pratt, Martha Elizabeth	Hadley	Hadley.
Pyle, Everett John	Plymouth	21 Pleasant Street.
Reed, James Burbank	Waltham	13 Phillips Street.
Rhoades, Lawrence Duncan	New Marlborough	13 Phillips Street.
Richter, Otto Hermann	Holyoke	7 Phillips Street.
Roberge, Charles Nataline	Williamsburg	44 Pleasant Street.
Robinson, Neil Cooley	Arlington	8 North College.
Russell, Charles Edwin	Dodge	30 Fearing Street.
Savage, Donald Clifford	West Medford	13 Phillips Street.
Sharp, Dallas Lore, Jr.	Hingham	Care of Mr. Everson.
Smith, Willard Elmer	Waltham	13 Phillips Street.
Snow, Osmond Webb	West Springfield	30 North Prospect Street.
Snyder, Allan	Holyoke	1 North College.
Spelman, Albert Francis	New London, Conn.	27 South Prospect Street.
Sullivan, Charles Burke ²	Fall River	29 North Prospect Street.
Sullivan, William Patrick	Holyoke	3 Allen Street.
Swan, Frederick Walter	North Easton	70 Lincoln Avenue.
Thompson, Arthur Richard	West Bridgewater	6 Nutting Avenue.
Tobey, Edwin Albert	Belmont	13 North College.
VanHall, Walter Bernhardt	Roslindale	M. A. C. Bungalow.
Verity, Herbert Foster	Woburn	27 Fearing Street.
Walker, Almeda Marion	Southbridge	2 Mount Pleasant.
Wardell, Raymond Arthur	Natick	3 Allen Street.
Whitaker, Lewis Harlow	Hadley	Hadley.
White, John Everett	Abington	70 Lincoln Avenue.
Williams, Earl Fletcher	Whitinsville	6 Nutting Avenue.
Wirth, Walter Leon	Minneapolis, Minn.	5 Fearing Street.
Zavorski, Theodore	Easthampton	5 North College.

SPECIAL STUDENTS.

Burnett, Marston	Cambridge	Wilder Hall.
Cartwright, Calton Oliver	Northampton	75 Pleasant Street.
Coveney, John Joseph	Amherst	Adams Farm.
Delaney, Rose	Holyoke	-
Hescock, Robert Eddy	Amherst	31 East Pleasant Street.
Hicks, Adeline Elizabeth	Amherst	The Davenport.
Hixon, Allen Wentworth	Worcester	11 South College.
Johnson, Harry	Hynes, Calif.	25 Gray Street.
Kennedy, Maurice Thomas	South Hadley Falls	57 Lamb Street, South Hadley Falls.
Martin, Ural Valentine	Pelham	Harkness Road, Pelham.
Matson, Anna Nathalie	Pasadena, Calif.	Abigail Adams House.
Mercier, Marie	Northampton	Draper Hall.

¹ Admitted on probation, entrance record incomplete.² Special freshman.

Paterson, William Leslie	Sarnia, Ont., Canada	45 East Pleasant Street.
Perley, Sadie	Gardner	Abigail Adams House.
Thayer, Cecile Edith	Greenfield	Abigail Adams House.
Wiklund, Carl John	Norfolk	4 North College.

Registered after the Catalogue for 1922 was published.

CLASS OF 1926.

Gannon, William James	Arlington.
Gorriaran, Manuel	Boston.
Haworth, George Goodman	Dalton.
Nolte, Whitney Roberts	Weston.
Sheldon, Herbert Carl	Cliftondale.

Special Student.

Bartley, Mary Ann	Amherst.
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GEOGRAPHICAL SUMMARY.

Massachusetts	449	Maryland	1
Connecticut	8	Minnesota	1
Maine	6	Ohio	1
New York	6	South Carolina	1
Rhode Island	5	Wisconsin	1
New Jersey	4	Canada	4
New Hampshire	5	Cuba	1
Vermont	3	Armenia	1
California	3	Asia Minor	1
Florida	2	Denmark	1
Michigan	2	India	1
Missouri	2	Russia	1
Pennsylvania	3		
Kansas	1	Total	514

SUMMARY BY CLASSES.

CLASS.	Men.	Women.	Total.
Graduate school	61	6	67
Seniors, 1924	87	7	94
Juniors, 1925	71	4	75
Sophomores, 1926	120	17	137
Freshmen, 1927	112	13	125
Specials	10	6	16
Totals	461	53	514

SHORT COURSE ENROLLMENT.

TWO-YEAR GRADUATES, 1923.

Adams, Alton Wales	Brattleboro, Vt.
Albee, Frank Smith	Lee.
Allen, Milton Clifford	North Dartmouth.
Ambrose, Earle Clifford	Amherst.
Armstrong, John Shepard	Attleboro.
Bacon, Harold Northrup	Welfare Island, N. Y.
Bangs, Walter Albert	Somerville.
Barnicle, Edward Joseph	Waltham.
Barrett, Avery Herbert	Brattleboro, Vt.
Beekman, Warren Amerman	Clover Hill, N. J.
Benson, John Melvell	Mount Desert, Me.
Blake, Roger Clarence	East Bridgewater.
Bligh, Norman Francis	West Willington, Conn.
Booth, Sarah Elizabeth	Springfield.
Breivogel, Henry Adam	Amherst.
Carlson, Carl Albert	Beverly.
Caron, Albert Francis	Orleans, Vt.
Case, Richard Seofield	Winchester.
Cox, Henry Jarus	Melrose.
Crandall, Alfred Arther	Montpelier, Vt.
Cutler, Walter Leon	Springfield, Vt.
Daw, Elwyn Hudson	Amherst.
DeNyse, Arthur William	North Amherst.
Edminister, Allen Williams	Brooklyn, N. Y.
Elliott, William James, Jr.	Brookline.
Emerson, Theodore Waldo	Chelmsford.
Fairman, Frederick Donald	Amherst.
Feeney, Charles Joseph	North Amherst.
Foster, Henry Cope	Centerville, R. I.
Galbraith, Hermon William	South Hadley.
Garrett, Wallace Frederick	Milton.
Harvey, William Moody	Waltham.
Hastings, Edward Henry	Worcester.
Haughland, Johan Richard	Somerville.
Hayward, Lester Burton	Amherst.
Henry, Carl Blaney	Westborough.
Hersome, Clyde Elwood	Lowell.
Hesse, Fred August	Hasbrouck Heights, N. J.
Hesse, Louis August	Hasbrouck Heights, N. J.
Johnson, Harold Webster	Melrose Highlands.
Kelley, Edward Bernard	South Hadley Falls.
Kelly, S. Schofield	Blackstone.
Kenison, Ralph Milton	Saugus.
Kitchell, Wilfred Harold	Winthrop.
Kleyla, Beatrice Barbara	South Deerfield.
Kruk, John Alexander	South Deerfield.
Kuppers, John Leonard	Worcester.
Legare, Ray Roosevelt	Petersham.
Legro, Chester James	Lynn.
Leitch, Fredonna	Amherst.
Luther, Bradford Wheeler	Fairhaven.
Marshall, Frederick William	Altona, N. Y.
Mattimore, James Francis	Worcester.
Maxson, Willis Henry	Berkeley, Calif.

McGrath, Matthew	Dedham.
McKenna, George Earle	Orange.
McKinstry, John Percy	Southbridge.
McNamara, Francis Joseph	Boston.
Merrifield, Ralph Addison	Athol.
Outhuse, Donald Stedman	Littleton.
Packard, Edward Albert	Dorchester.
Park, William Hamlin	Newtonville.
Perry, Udell Thurston	Santuit.
Potter, Raymond Terry	Dorchester.
Rambo, Samuel Everett	Grafton.
Rand, George Lister	Amherst.
Ravinski, Albert John	Dover.
Rawson, Floyd Stuart	East Douglas.
Richardson, Milton Carlton	West Brookfield.
Sahlin, Harry Sixten	Dorchester.
Sayles, Arthur Updike	Providence, R. I.
Schnitzer, Harold Edward	Newport, R. I.
Scribner, Harry Verne	Waltham.
Slattery, John Thomas	Hatfield.
Smith, Charles Emerson	Westfield, N. J.
Smith, William	Whitinsville.
Spengler, Robert	Springfield.
Spooner, Edward Howland	Brimfield.
Stevenson, John	Sunderland.
Steuer, Clifton Baird	Yarmouth Port.
Stickney, Burton Marsh	Chester, Vt.
Sunbury, Kenneth Arthur	Lowell.
Swanson, Paul Fredolf	Chelmsford.
Swenbeck, Herman Robert	Boston.
Thomas, Leon Chessman	South Weymouth.
Trull, Benjamin Franklin	Lowell.
Tufts, William Harold	North Easton.
Unwin, Edward	Amherst.
Wales, Forrest Martin	Stoughton.
Walker, Wallace Hayward	Ashby.
Weagle, Dennis William Scot	Marlborough.
Weed, Theodore Henry	Lenox.
Wells, Alphonsus	Brighton.
Westervelt, Harold Eric	Tenafly, N. J.
Wheeler, Charles Paine	Brimfield.
Wiedenmayer, George	Glen Ridge, N. J.
Wilson, Henry James	Boston.
Woodward, Everett Brigham	Hubbardston.

VOCATIONAL POULTRY GRADUATES, DECEMBER, 1922.

O'Brien, James Laurence	Dorchester.
Putnam, Ethel Davis	Worcester.
Shulver, Arthur	Amherst.
Thibault, Arthur Joseph	Lowell.

TWO-YEAR COURSE, 1923-24.

Second Year.

Adelt, Joseph Francis, Jr.	Adams	Baker Place.
Aiken, Howard William	Amherst	Nash Block.
Aldrich, James Orin	Belchertown	Belchertown.
Austin, Eunice Marie	Fall River	Abigail Adams House.
Baker, Ralph Holabird	Cambridge	60 Pleasant Street.
Beley, Robert Arsene	Newtonville	8 Boston Street.
Bisbee, John Carroll, Jr.	Moretown, Vt.	35 East Pleasant Street.
Blanchard, Lawrence Newell	Leominster	French Hall.
Blue, James Reuben	Stony Point, Va.	35 East Pleasant Street.
Booth, George Wellesley	Everett	83 Pleasant Street.
Brown, Herbert Ellsworth	North Amherst	Pine Street, North Amherst .

Bryant, Berton Davis	Lowell	Box 80, M. A. C.
Carter, William Bradley	Tewksbury	North College.
Chisholm, Roy Bedford	Wollaston	3 South Prospect Street.
Clarkson, Arnold	Reading	101 Pleasant Street.
Cole, Albert Bradley	Red Hook, N. Y.	29 Lincoln Avenue.
Conklin, Lester Martin	Patchogue, N. Y.	29 Lincoln Avenue.
Craig, Kenneth	Boston	5 Hitchcock Street.
Cromack, Elwin Baldwin	Colrain	6 Nutting Avenue.
Cutler, Samuel Austin	Boylston	M. A. C. Bungalow.
Darling, Walter	Franklin	Baker Place.
Dennèn, Charles Otis	East Pepperell	Kolony Klub.
Dennison, Leon Henry	Atlantic	83 Pleasant Street.
Densmore, Theodore Calder	Natick	North College.
Doane, Robert Allen	North Brookfield	Kolony Klub.
Eastwood, Wilfred	North Adams	Kolony Klub.
Emery, Russell Louis	Needham	35 East Pleasant Street.
English, Sherman Clements	Mattapan	17 Phillips Street.
Files, Arthur Dysart	Ludlow	North College.
Fitts, Harry Bucklin	Orange	7 Woodside Avenue.
Fortune, Battie Holmes	Boston	Abigail Adams House.
Frawley, Earl Alton	New Bedford	81 Pleasant Street.
Giessler, Carl Donald	Woods of Larchmont, N. Y.	81 Pleasant Street.
Glencross, John Donald	Amherst	9 Amity Street.
Goode, Frank Arthur	Milton	101 Pleasant Street.
Goodnow, Alice Marguerite	Athol	Abigail Adams House.
Hafermehl, Forrest Wendell	Newton Centre	17 Phillips Street.
Harris, George Mitchell	Lynn	Amherst Tavern.
Haskell, Dorothy Edith	Holyoke	Abigail Adams House.
Hawthorne, Peter, Jr.	Amherst	1 Shumway Street.
Haynes, Joseph Dwight	Keene, N. H.	Sunset Avenue, care of Professor Banta.
Hazard, James Joseph	Providence, R. I.	20 Woodside Avenue.
Hazen, Stanley Luther	Longmeadow	Kolony Klub.
Healey, Martin Joseph	Hubbardston	15 Hallock Street.
Higgins, Leonard Martin	Fall River	Kolony Klub.
Hillman, Nelson Bennett	Fairhaven	North College.
Hines, Oliver Clayton	Amherst	Amherst House.
Howe, Wesley Mason	Millbury	North College.
Hulbert, Jewett William	Boston	27 Fearing Street.
Jones, Charles K.	Waitsfield, Vt.	35 East Pleasant Street.
Jones, Wendell Albert	Roslindale	R. F. D. No. 3, Box 82.
Joslin, Ralph Herbert	Waitsfield, Vt.	35 East Pleasant Street.
Lacombe, Albert George	Beverly	17 Kellogg Avenue.
Lane, Maynard Wallace	Gloucester	North College.
Lauterbach, Louis Jacob	Roslindale	Kolony Klub.
Longley, Lawrence Stanley	Greene, Me.	31 North Prospect Street.
Lowe, Dwight Mansfield	Watertown	8 Allen Street.
MacFadyen, Alfred Wellington	Wellesley	20 Lessey Street.
Macuen, Harvey Andrew	Newton	R. F. D. No. 3, Box 82.
Martyn, Roland Fowler	West Suffield, Conn.	Mount Pleasant.
Merchant, Percy Albert	Gloucester	North College.
Miller, Everett Woodman	Fairhaven	84 Pleasant Street.
Norell, John	Sunderland	Sunderland.
O'Doherty, John Edward	Woburn	81 Pleasant Street.
Olsen, Harold Bailey	Pepperell	31 North Prospect Street.
Paddock, Franklin Selby	Worcester	M. A. C. Farmhouse.
Palmer, Albert Tresnon	Everett	6 Phillips Street.
Parsons, Sidney Wing	Conway	Baker Place.
Patterson, Millard James	Ipswich	Kolony Klub.
Peaslee, George Raymond	Pittsfield	Kolony Klub.
Peklaris, Spiros Antony	Boston	2 North College.
Prentiss, Arthur Palmer	Danvers	Kolony Klub.
Rooks, Roger Franklin	Allston	4 Chestnut Street.
Sahlin, Carl Evert	Somerville	3 McClure Street.
Scotland, Gordon Lionel	Saxonville	4 Nutting Avenue.
Smith, William John	Charlestown	35 East Pleasant Street.

Solomon, Maurice	Melrose	French Hall.
Springer, Harry Brooke	North Amherst	North Amherst.
Stevens, Glenn William	Ward Hill	North College.
Stover, Walter Edward	Wellesley Hills	Kolony Klub.
Thompson, George Howard	Worcester	Belchertown Road.
Tobin, Michael Francis	Adams	Kolony Klub.
Tucker, Clarence Murray	Waitsfield, Vt.	35 East Pleasant Street.
Turfs, Clarence Joseph	Worcester	6 Phillips Street.
Walker, Franklin Perry	Westborough	6 Nutting Avenue.
Webster, Phyllis M.	Cambridge	Abigail Adams House.
White, Laurence Schaffner	Dover	Stockbridge Hall.
White, Newell Dudley	Bristol, Conn.	Pelham Road.
Wydeen, Albert Ferdinand	Amherst	R. F. D. No. 1.

First Year.

Ackerman, Randolph Spofford	Salisbury	13 Phillips Street.
Ansell, Harold King	Grantwood, N. J.	9 Fearing Street.
Arnold, Elliott Frank	Woburn	27 Fearing Street.
Baker, Willis A.	Winchester	23 East Pleasant Street.
Berry, Harold Edward	West Natick	108 Pleasant Street.
Blais, Lester Theodore	Holyoke	9 Fearing Street.
Breckenridge, Earl	Lawrence	7 Nutting Avenue.
Brownell, Abbott Francis	New York, N. Y.	17 Phillips Street.
Buswell, Albert Henry	Somerville	3 Fearing Street.
Carter, Carlton Maguire	South Essex	101 Pleasant Street.
Cepurneek, Andrew John	Wrentham	101 Pleasant Street.
Chaffee, Curtis Walter	Burlington, Vt.	40 Amity Street.
Chilson, Dorothy Lila	Huntington	Abigail Adams House.
Cooper, Janice Marie	Westfield	18 Sunset Avenue.
Crooks, Donald Lovell	North Brookfield	15 Hallock Street.
Crooks, Harold Baker	North Brookfield	15 Hallock Street.
Cummings, Frank James	North Adams	101 Pleasant Street.
Dennett, James Winslow	Plympton	101 Pleasant Street.
Densmore, Miles Winthrop	Natick	101 Pleasant Street.
Derby Benjamin Edward	Concord Junction	17 Kellogg Avenue.
Dow, Frederick Adams	Melrose	Fearing Street.
Flexer, Carl Seler	Allentown, Pa.	The Davenport.
Fredrickson, Gunnar Knute	Brockton	116 Pleasant Street.
Friedli, George Edward	Yonkers, N. Y.	7 Nutting Avenue.
Frieh, George Joseph	Jamaica Plain	66 Pleasant Street.
Fuller, Douglas William	Southampton, L. I., N. Y.	7 Nutting Avenue.
Griswold, Christine Mueller	Springfield	Abigail Adams House.
Hall, Ivory Arthur	South Portland, Me.	3 Nutting Avenue.
Harrington, Donald Francis	Framingham	75 Pleasant Street.
Harrington, Douglas Waldemar	Framingham	75 Pleasant Street.
Hartney, Clyde Clarence	Athol	101 Pleasant Street.
Hayn, Ernest Morris	Springfield	17 Phillips Street.
Hill, Dorothy Rice	Rockland, Me.	Abigail Adams House.
Hubbard, George Clayton	Holyoke	25 Taylor St., Holyoke.
Johnson, Mary	Boston	Abigail Adams House.
Jordan, William D.	Somerville	3 Fearing Street.
Kalberg, Mildred May	East Cambridge	Abigail Adams House.
Kane, John Vincent	Lenox	17 Phillips Street.
Keyes, Madelon Frances	Dorchester	Abigail Adams House.
Kingsbury, Carl Manning	Woodville	Sunset Avenue.
Kyle, Gordon	Everett	70 Lincoln Avenue.
Lamont, Alton Woodbrey	Auburndale	11 South College.
Lawton, Clarence Copeland	Worcester	27 Fearing Street.
Lindgren, Lawrence Edward	Worcester	60 Pleasant Street.
Mahoney, Joseph Frederick	North Easton	70 Lincoln Avenue.
Matuleurecz, Andrew Joseph	Orange	Overlook Farm.
Mecum, Ethel Doris	Becket	Abigail Adams House.
Mellor, John Albert	West Somerville	3 McClure Street.
Merrynan, Rebecca Eastman	Bradford	Abigail Adams House.
Montague, Guilford	Sunderland	83 Pleasant Street.

Moulton, Marshall T.	Ipswich	101 Pleasant Street.
Murphy, Thomas Patrick	Woburn	3 Fearing Street.
Myers, Morley Whitfield	Hingham	101 Pleasant Street.
Nutter, Richard Louis	Melrose Highlands	17 Kellogg Avenue.
Patterson, Harold Taylor	Barre	75 Pleasant Street.
Patch, Frederic Whiting	Framingham	75 Pleasant Street.
Payne, Donald Tubbs	Dunstable	101 Pleasant Street.
Perkins, Harold Kent	Melrose Highlands	5 Hitchcock Street.
Pickard, Cyrus Warren	Concord Junction	17 Kellogg Avenue.
Pomeroy, Allen Bradford	Longmeadow	9 Fearing Street.
Power, James Anthony	Arlington	4 Nutting Avenue.
Reynolds, Helen Caroline	Haverhill	Abigail Adams House.
Ross, Edward Cooper	Watertown	7 Nutting Avenue.
Safford, Nathaniel Morton	Milton	75 Pleasant Street.
Scott, Thomas John	Bristol, Conn.	Amherst Tavern.
Severance, Charles Almon	Moultonboro, N. H.	8 Allen Street.
Smith, Herman Douglas	Wellesley	17 Phillips Street.
Snodgrass, Bernard Rudolph	Toledo, O.	3 Fearing Street.
Stow, Basil Tenney	Stow	70 Lincoln Avenue.
Thayer, Richard Horton	Somerville	Mt. Pleasant, care of Mr. C. R. Green.
Thompson, Kenneth Horatio	Revere	45 Pleasant Street.
Titus, Alvin Randolph	Allston	101 Pleasant Street.
Tower, Lester Wilton	South Weymouth	Box 4, North Amherst.
Towne, Milton Curtis	Petersham	101 Pleasant Street.
Welch, John D.	Northfield, Vt.	101 Pleasant Street.
Wetherbee, Roger Frederick	Pepperell	31 North Prospect Street.
Wilson, Herbert Ralph	Everett	70 Lincoln Avenue.
Woodruff, Webster Clinton	Fitchburg	Fearing Street, care of Mrs. Nims.
Wooley, Miriam Ryder	Malden	Abigail Adams House.
Wright, Harriet Goodhue	Boston	Abigail Adams House.

VOCATIONAL POULTRY COURSE, 1923-24.

Frasier, Richard Pope	Brockton	69 Lincoln Avenue.
Kaligian, Kenneth Mitchell	Holbrook	Eames Avenue.
Lalumiere, William A.	Haverhill	15 Fearing Street.
Seppa, Karl Ivar	Gardner	101 Pleasant Street.

WINTER SCHOOL, 1923.

Ahrens, Theodore	Mittineague.
Anderson, Walter S.	Southwick.
Bacon, William H.	Everett.
Baker, George L.	Amherst.
Barney, Rodman S.	North Swansea.
Barrett, Francis L.	Furnace.
Bates, Donald H.	North Amherst.
Bittman, Andrew J.	Maplewood, N. J.
Blakesley, Raymond W.	Westhampton.
Boman, Lauri	Ashburnham.
Brooks, Franklyn J.	-
Burrington, Reginald C.	North Amherst.
Carey, Robert B.	Springfield, Vt.
Clapp, Raymond L.	Northfield.
Clark, Edward P.	Richmond.
Cook, Chester A.	Reading.
Coryell, Eliot B.	Birmingham, Mich.
Curtis, Francis S.	Chestnut Hill.
Daley, John P.	Beverly.
Diebner, Mrs. Louis J.	Amherst.
Dill, Thomas G.	Raynham Centre.
Donald, David	Pittsfield.
Egleston, Lilian	Elizabeth, N. J.
English, Edwin L.	Boston.
Fillmore, W. L.	Amherst, Nova Scotia.

Feeney, Ellen M.	Amherst.
Foss, Thelma	Auburn, Me.
Frishkopf, Michael	New York, N. Y.
Garfield, Henry G.	Saxonville.
Gates, Lucinda	Newtonville.
Gilbert, Lawrence W.	Springfield.
Godvin, Mary V.	Jamaica Plain.
Griswold, Emily K.	Greenfield.
Gustin, Francis B.	North Amherst.
Harrison, R. Clive	Longwood, Ontario, Canada.
Hasanovitz, Samuel	North Middleborough.
Haslam, Emerson F.	Westwood.
Heald, Kenneth F.	Amherst.
Hixon, Allen W.	Worcester.
Jenks, Bertha A.	Amherst.
Jenks, Jabez C.	Amherst.
Kelly, Shaun	Richmond.
Kerner, Nathan M.	Roxbury.
Kimball, John A.	Westford.
Kindsgrab, William	West Orange, N. J.
Leary, Edward J.	Tewksbury.
Liepe, Fred G.	Cologne, N. J.
Matthies, Robert A.	West Roxbury.
McLeod, Duncan F.	Marlborough.
McSweeney, Margaret	West Roxbury.
Melican, George D.	Worcester.
Miltimore, John E.	Derry, N. H.
Nelson, Fred W.	Reading.
Nielson, Malcom H.	Newton.
Orr, Harold G.	Chicopee.
Parker, Charles W.	East Orleans.
Parker, Helen M.	East Orleans.
Prendiville, Jane	Worcester.
Rambo, Mildred	Sunderland.
Rankin, Mildred	Boston, Mass.
Rautenberg, Gustave H.	Leonia, N. J.
Reardon, Louis A.	North Abington.
Reed, MacMinn N.	Brewster.
Robinson, Gordon W.	Lexington.
Roper, Harold B.	Ipswich.
Ruedlinger, Arthur J.	Minneapolis, Minn.
Scace, Charles H.	Pittsfield.
Schaefer, Edward G.	Avon, Conn.
Shaw, Glenn, D.	Bath, Ohio.
Sisson, Philip R.	Woodville, R. I.
Sleeper, Charles E.	Haverhill.
Smith, Carrie A.	West Brookfield.
Solomon, Hyman S.	Colchester, Conn.
Somes, Ronald K.	North Edgecomb, Me.
Stearns, Carleton M.	Melrose.
Steere, George M.	Southwick.
Stemmle, Joseph J.	Springfield, N. J.
Terrill, Harry	Greenfield.
Truesdell, Francis E.	Shelburne.
Unwin, Vera E.	Amherst.
Wade, Edwin S.	Leeds.
Warren, Miriam E.	Chelmsford.
Watt, Raeburn M.	Lancaster, Ontario, Canada.
Weld, Arthur B.	Wakefield.
Zeiss, Harold	Pasadena, Calif.

SCHOOL FOR FLORISTS, JUNE 25-30, 1923.

Anderson, Charles A.	Easthampton.
Bollinger, Godfrey	Cromwell, Conn.
Edwards, Clarence J.	Milton.

Hunt, Lawrence E.	Rutland, Vt.
Parker, Katherine V.	South Lancaster.
Perkins, Granville N.	Westwood.
Rose, Herbert A.	Walpole.
Richardson, Jane T.	Lancaster.
Rugg, Gladys J.	Simsbury, Conn.
Townsend, Anna	Winchendon.
Ward, M. E.	Dedham.

COURSE FOR COUNTRY CLERGYMEN, JULY 9-13, 1923.

Allen, George E.	Plainfield.
Anderson, William S.	Montague.
Barnes, Lincoln W.	Amherst.
Coldwell, S. A.	Shutesbury.
Dixon, Herbert	Heath.
Doggett, Allen B., Jr.	Hampton Institute, Va.
Eells, Edward	Chesterfield.
Eells, Mrs. Edward	Chesterfield.
Emrich, F. E.	Boston.
Hanna, John B.	Amherst.
Hatch, David P.	Lancaster.
Hawley, John A.	Amherst.
Hillard, Dow L.	Belchertown.
Hope, Arthur H.	Hadley.
Israel, Henry	Hastings-on-Hudson, N. Y.
Ives, Henry Goodson	Amherst.
Kerr, Archibald	South Amherst.
Lindeman, E. C.	-
Lohmann, Hermann	Whately.
Luther, C. F.	Amherst.
Manwell, John P.	Williamsburg.
Moulton, J. W.	Worthington.
Nichols, Jesse G.	South Hadley.
Oxnard, Henry E.	Rehoboth.
Richmond, James	Otis.
Root, E. Tallmadge	Boston.
Rutledge, Lyman V.	Dorchester.
Sangree, Carl M.	Cummington.
Smith, C. E.	Prescott.
Smith, C. H.	Granby.
Struthers, A. L.	West Brookfield.
Struthers, Mrs. A. L.	West Brookfield.
Waldron, John D.	Mattapoisett.
Wightman, J. C.	Northampton.

SUMMER SCHOOL, 1923.

Acheson, Lillian	Fall River.
Allen, Fanny G.	Hadley.
Baker, M. Barbara	Newtonville.
Bancroft, Ada N.	Winchendon.
Barnett, Mrs. Grace B.	-
Batchelder, Stewart P.	North Reading.
Benson, Mable A.	North Amherst.
Binner, Mrs. Teresa C.	Amherst.
Bistrek, Helen M.	Northfield.
Bögholt, Carl N.	Newport, R. I.
Bolingbroke, Mrs. Isabel	Roxbury.
Brown, Elsie C.	North Amherst.
Brown, Jessie S.	Northampton.
Buchanan, Walter G.	Bernardston.
Butterworth, Mrs. T. F.	Amherst.
Canavan, Anna M.	Amherst.
Canty, Mary F.	Chicopee.
Chace, Martine H.	Fitchburg.
Chace, Lydia G.	Providence, R. I.

Chandler, Irene	West Hatfield.
Cole, Maude R.	Amherst.
Crafts, Mrs. D. C.	Northampton.
Crowley, Eileen K.	Amherst.
Dana, Minnie L.	Amherst.
Davison, Mrs. Hart	Amherst.
Donnelly, Alice M.	Fitchburg.
Drain, Mrs. Brooks	Amherst.
Duncan, Edith W.	Josephine, North Dakota.
Eaton, Nancy	Wells, Me.
Elder, Jeannette M.	Amherst.
Fairman, Myrtle B.	Amherst.
Fairman, Ruth E.	Springfield.
Fentem, Alice E.	West Chester, Pa.
Fentem, Beth	West Chester, Pa.
Fisher, Lina E.	Amherst.
Frellick, Arthur L.	Everett.
Frellick, Ralph S.	Everett.
Frost, Eleanor	Amherst.
Gallagher, Frances I.	Charlestown.
Geiger, Eleanor C.	Pepperell.
Gilbert, Chauncey M.	North Amherst.
Gilbert, Marguerite F.	North Amherst.
Govaerts, Mima H.	Holliston.
Graham, Doris M.	Amherst.
Gustin, Mrs. B. F.	North Amherst.
Harrington, Mrs. J. O.	Amherst.
Harrison, Edwin M.	Montclair, N. J.
Hassell, Harriett	Conway.
Hatch, Mary A.	Holyoke.
Hathaway, Marion H.	Warren.
Hawley, Merle E.	Amherst.
Hodgdon, Julia P.	Hannibal, Mo.
Howe, Jenabelle D.	North Amherst.
Ivers, Mary J.	Holyoke.
Jayne, Addie	Brooklyn, N. Y.
Jones, Mrs. Carleton P.	Amherst.
Julian, Mrs. A. N.	Amherst.
Kelley, Mrs. J. J.	Amherst.
Kelly, Leslie M.	Amherst.
Kingsford, Vera A.	Boston.
Knightly, Mary R.	Amherst.
Laduke, Ida	Worcester.
Leitch, Elinor W.	Amherst.
Lewis, Gwendolen	Amherst.
Lynch, Grace V.	Boston.
Macurdy, Louise B.	Watertown.
Mannix, Alice G.	Holyoke.
Martin, Lillian C.	New Bedford.
Mayo, William I.	Northampton.
McMullen, Anastasia U.	Watertown.
Meserve, Mary L.	North Amherst.
Meyette, Florence A. M.	George's Mills, N. H.
Michels, Mrs. C. A.	Amherst.
Minor, Frances	New York, N. Y.
Morse, Ruby H.	Amherst.
Murdock, Dorothy W.	Marblehead.
Newpert, Mrs. Florence E.	Amherst.
O'Brien, Katherine F.	Amherst.
O'Connor, Arthur M.	Amherst.
Oettinger, Emma M.	Boston.
O'Leary, Margaret Z.	New Bedford.
Parker, Lillian Y.	Greenland, N. H.
Pendleton, Margaret G.	Amherst.
Pierpont, Mildred	Amherst.
Pushee, Mrs. G. F.	North Amherst.

Putnam, Ethel D.	Worcester.
Quigley, Teresa B.	New Bedford.
Rand, Helen M.	Fairfield, Idaho.
Reed, James P.	Hadley.
Reed, Mrs. James P.	Hadley.
Richmond, Mrs. Mary E.	Arlington, N. J.
Rile, Mary E.	North Amherst.
Roberts, Ruth W.	Amherst.
Rowell, Eleanor E.	Amherst.
Safford, Elizabeth L.	South Hadley.
Salisbury, Mrs. Golda W.	Amherst.
Sawyer, Bessie F.	Fitchburg.
Sawyer, Louise W.	Fitchburg.
Scribner, Agnes E.	Amherst.
Serex, Bertha S.	Amherst.
Shannon, Kate L.	Jamaica Plain.
Sharpe, Charles G.	Amherst.
Shaw, Arthur E.	Walpole.
Slater, Dora E.	Dalton.
Smith, Ralph L.	Kennebunkport, Me.
Smith, Wendell F.	Needham.
Spaulding, Marion	Amherst.
Springer, Fern B.	North Amherst.
Staples, Dorothy E.	Pittsfield.
Stowe, Edmund M.	Hudson.
Sullivan, Catherine E.	Amherst.
Sullivan, Mary G.	Boston.
Sullivan, Teresa	-
Taylor, Emily	Amherst.
Taylor, Ralph G.	Lowell.
Terry, Julia S.	Amherst.
Thurlow, Henry P.	Salisbury.
Tootill, Verona E.	Pittsfield.
Toye, Louise A.	Hampton Beach, N. H.
Twible, Alice J.	Gilbertville.
Vance, Ruth	Norwood.
Van Duzor, Charlotte E.	Franklin.
Walker, Lillian B.	Amherst.
Weiler, Grace E.	Amherst.
Welch, Alice K.	Holyoke.
Whipple, Grace M.	Amherst.
Whipple, Ellen	Amherst.

STUDENTS REGISTERED AFTER THE CATALOGUE FOR 1922-23 WAS PUBLISHED.

Two-Year Course.

Second year:

Burnett, Marston	Cambridge.
Ross, Ian Hamilton	New York, N. Y.
White, Donald Mitchell	Winthrop.

First year:

Brown, Elsie	North Amherst.
Healey, Frank Hugh	Clinton.
Rogers, John	Cambridge.
de la Torriente, Jose Elias	Cotorro, Cuba.
Zinn, Arnold Stanhope	New York, N. Y.

Vocational Poultry Course.

Doherty, Edward	Woburn.
Gay, Albert Denison	Greenfield.
Myers, William Kennedy	New Haven, Conn.
Phipps, Carleton Lawrence	Holliston.
Whitman, Kenneth Towne	Hancock.

SUMMARY OF SHORT COURSE ENROLLMENT.

	Men.	Women.	Total.
Two-year Course, second year	84	5	89
Two-year Course, first year	68	12	80
Vocational Poultry Course	4	—	4
Winter School, 1923	69	16	85
School for Florists	7	4	11
Course for Country Clergymen	32	2	34
Summer School, 1923	17	110	127
Totals	281	149	430

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Economics and Sociology	92	Agricultural Chemistry	44
Entomology	77	Agricultural Economics	47
Farm Management	55	Agricultural Education	48
Floriculture	59	Agronomy	34
Forestry	61	Animal Husbandry	35
French and Spanish	97	Dairying	36
Geology	91	Economic Botany	43
German and Music	99	Economic Entomology	45
History and Government	93	Farm Management	37
Home Economics	110	Floriculture	39
Horticultural Manufactures	62	Landscape Gardening	40
Horticulture	63	Microbiology	46
Landscape Gardening	64	Pomology	41
Language and Literature	94	Poultry Husbandry	38
Mathematics and Civil Engineering	81	Rural Sociology	49
Microbiology	83	Vegetable Gardening	42
Military Science	111	Memorial Hall	147
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THE M. A. C. BULLETIN AMHERST, MASSACHUSETTS

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THE SIXTY-FIRST ANNUAL REPORT OF THE MASSACHUSETTS AGRICULTURAL COLLEGE

ISSUED IN ACCORDANCE WITH SECTION 8, CHAPTER 75, OF THE GENERAL LAWS

PART I.—THE REPORT OF THE PRESIDENT AND OTHER OFFICERS OF ADMINISTRATION FOR THE FISCAL YEAR ENDED NOV. 30, 1923



PUBLICATION OF THIS DOCUMENT APPROVED BY THE COMMISSION ON ADMINISTRATION AND FINANCE

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PAYSON SMITH, *Commissioner of Education.*

KENYON L. BUTTERFIELD, *President of Massachusetts Agricultural College.*

MASSACHUSETTS AGRICULTURAL COLLEGE.

REPORT OF THE PRESIDENT.

REVIEW OF THE YEAR.

Resignations and Retirements.

During the year two members of our teaching staff reached the age of seventy and retired as required by State law.

Professor William R. Hart left our service March 31st. He joined the staff in 1907 as Professor and Head of the Department of Agricultural Education. This was the first institution in the country to recognize Agricultural Education as a separate department. Professor Hart soon became recognized as one of the aggressive and sane thinkers in the field of agricultural education. He did more than any other individual in the State to broadcast the idea of Boys' and Girls' Clubs and to organize them for work. Among the four-year students he always stimulated a keen interest in education. Prior to 1907 there were probably less than a dozen M. A. C. men teaching in Massachusetts. Of the graduates of the last sixteen years (1908 to 1923) 122 are teaching in Massachusetts, 108 are in schools or colleges outside of Massachusetts and 35 are engaged in Extension teaching. It has been said of Professor Hart that he "had the clearest vision of the fundamental basis of vocational training of any man engaged in work dealing with the theory of such training. This was openly recognized by many. He held steadfastly to his ideal of what his department should be and never wavered under the most discouraging circumstances."

Professor W. S. Welles, who joined our staff in 1919, has been made Head of the Department of Agricultural Education. Professor Harry N. Glick has been brought into the Department to fill the vacancy caused by Professor Hart's retirement. Professor Glick was raised on an Illinois farm and has had wide experience in educational work; he has taught school many years and has pursued graduate study in education at the University of Illinois.

Dr. Charles Wellington retired May 4th. A graduate of the class of 1873, he returned to teach in the Department of Chemistry in 1885. From 1882 to 1885 he studied in Germany, receiving the Degree of Doctor of Philosophy at the University of Göttingen in 1885. He was one of the first chemists trained by the late Dr. Goessmann of whom Dr. Wellington was a loyal disciple. Dr. Wellington gave 38 years of faithful service to the College, during which time he won the respect and love of a host of M. A. C. men.

Arthur N. Julian, who has been teaching German since 1912 and who has been studying Chemistry for three or four years, has been transferred to the Department of Chemistry as Assistant Professor, to fill the vacancy caused by the retirement of Dr. Wellington.

On August 31, Professor S. M. Salisbury resigned as Professor and Head of the Department of Animal Husbandry. Professor Salisbury joined our staff in 1919 and has maintained the high standing of this department established by Professor McNutt and Professor McLean. Professor Salisbury left to accept a position in the Extension Service of the College of Agriculture at the Ohio State University.

Near the close of the fiscal year, Harold F. Tompson, Professor and Head of the Department of Vegetable Gardening, resigned in order to devote his at-

tention to the supervision of his market gardening farm at Seekonk, Mass. Professor Tompson graduated from the Massachusetts Agricultural College in 1905; served as instructor in market gardening here for two and one-half years, and after further experience in teaching and in practical work, in 1914, was called back as Head of the Department. In addition to directing the resident teaching in Vegetable Gardening, he had charge of the Market Garden Field Station at East Lexington; he assisted in the selection of the site and planned the program for the demonstration work there. He has been eminently successful in meeting the needs of the market gardening industry as they have been developed in the vicinity of Boston and his service has been uniformly approved by the market gardeners.

In September, Professor James A. Foord resigned as Head of the Division of Agriculture and will, as soon as his successor is appointed, devote his entire time to the Department of Farm Management. Professor Foord has been Head of the Division of Agriculture since 1907, during which time, from a small department, the Division, as it is now organized, has been built up, both with respect to personnel and to buildings. During this time Professor Foord has had charge of the details of this large development in which he has rendered a most conscientious and highly painstaking service.

On August 25, 1923, Newton Wallace, who from 1896 to 1917 had charge of the power plant and served as electrician and engineer of the College, died at Huntington, Mass. For many years he was a conspicuous figure on the campus and to him is due the credit for the early development of the central heating plant, laying out of steam, water and sewer mains, and other problems connected with the supplying of light and power for the various buildings.

Improvements and New Construction.

The Legislature of 1923, as was contemplated in 1922, made an appropriation of \$150,000 for the completion of the Chemistry Laboratory. Owing to labor and other difficulties, work on this building has progressed very slowly. It is doubtful whether the building will be completely ready for occupancy before the summer of 1924.

The appropriation of \$10,500 for roads and walks has been used on "The Olmsted Road" in constructing a road with stone base and asphalt surface, from the entrance to the campus at Pleasant Street, extending a distance of 1300 feet; and for the construction of a cement sidewalk parallel with this road. For obvious reasons it seemed desirable to locate the new walk north of the row of trees, extending along this road; this made necessary the extension of the bridge across the stream. The result is entirely satisfactory and commends itself to all interested. The Division of Highways of the State Department of Public Works supervised the construction of this road; this arrangement insured us the maximum of efficiency and economy.

The other special appropriations of 1923 for live-stock, for additional buildings at the Tillson Farm, for service buildings for the Division of Horticulture and for a farmhouse to replace the one destroyed by fire in December 1922, have been expended for the purposes specified.

Commencement.

Owing to a feeling on the part of students that they were placed at a disadvantage in securing summer work by the late Commencement scheduled for 1923, the Trustees voted to dispense with the spring vacation, cut down the length of the spring term to eleven weeks and close the institution for the summer vacation June 11. Accordingly, the usual commencement exercises were held from Friday to Monday, June 8 to 11. The commencement address on June 11 was delivered by Honorable W. N. Ferris, United States Senator from Michigan. The degree of B. Sc. was conferred upon 82 men and 7 women; the degree of M. Agr. upon 2 men; the degree of M. Sc. upon 8 men and 1 woman and the degree of Ph. D. upon one man.

Enrollment of Students.

In Courses of Collegiate Grade.—It was pointed out in the report of a year ago that the attendance of students at the Agricultural Colleges had steadily declined during the past few years. The Massachusetts Agricultural College has maintained its enrollment better than the majority of similar institutions, although this year, there is a slight falling off in total attendance; the total is 431 exclusive of the Graduate School as compared with 470 in 1922. The enrollment in the entering class is 125 or approximately two-thirds that of a year ago. The cause for the reduction in attendance, in this and other similar institutions, has not been satisfactorily explained. Probably the feeling that the food producers of the country are receiving an inadequate return for their service is reflecting itself in the minds of those who would otherwise attend an agricultural college for the purpose of preparing themselves for some agricultural occupation. Statistics have been compiled from approximately half the agricultural colleges of the country showing their comparative enrollment of freshman students in 1922 and 1923. Of the twenty-six institutions reporting, seven show a gain in Freshman registration in 1923 over 1922; the total gain of these seven institutions is 50. Nineteen institutions report a decrease in enrollment and the total loss in these nineteen institutions is 461.

In the Two-Year Course.—There is a marked decrease in the enrollment of two-year students. In 1920 the enrollment was 277; in 1921, 293; in 1922, 257 and in 1923, 169. This decrease is due in part to the withdrawal from this institution of a number of Federal Board students who have either finished their training or who have been transferred to other institutions established primarily for the rehabilitation of service men. The analysis of attendance in all courses is found on page 25.

Students entering the Freshman Class in 1923.

Of the Freshmen entering this autumn, slightly over 95% are from Massachusetts. Apparently the requirement of an annual tuition of \$180 for students from states other than Massachusetts has very effectively cut off the attendance from other states. Formerly 10% to 15% of each Freshman class came from other states. I should like to ask whether this tendency, brought about by the increase in tuition, is wholly desirable? Ought there not to be encouraged a normal exchange of students between the Agricultural Colleges? At present more Massachusetts boys are being educated in state institutions outside of Massachusetts than the total of non-resident students at the Massachusetts Agricultural College.

The opinion has been frequently expressed that students do not come to the Massachusetts Agricultural College because of their interest in agriculture. A special inquiry was made of students entering this autumn, to ascertain why they came to the Massachusetts Agricultural College. 67% stated that they came because of their interest in agriculture; 25% stated that they came because they desired a general education, either with or without respect to agriculture; 5% came with the idea of transferring to other institutions at the end of one or two years, and 3% came because of other considerations.

Research Work in Forestry.

In June an agreement was entered into with the United States Forest Service providing for the location at this institution of a Forest Experiment Station for the Northeastern area. The College, by the agreement, obligates itself to supply quarters, including office space and laboratory facilities, heat, light and janitor service for the staff which will be placed here. At the outset this staff will include approximately five foresters, one pathologist, two entomologists and two clerks. The staff of foresters is being accommodated in French Hall. As the Pathologist and Entomologists are added, they will be housed respectively in Clark Hall and Fernald Hall. There has been some delay in the staff coming to Amherst and at present not all are here. The work, however, is well under way.

This co-operative arrangement will cost the institution practically nothing and will bring to it the prestige attendant upon the location of such an Experiment Station, and will greatly strengthen the teaching work in Forestry.

Excursions to the College.

During the past few years groups of people from various parts of the State have been coming to the College in greater numbers. Some of these groups attend formal programs such as Farmers' Week or High School Day, while others come for less definite objectives but all for the purpose of inspecting the institution with more or less thoroughness. To illustrate the extent to which these excursions are now being made to the College, the following list is given, covering the fiscal year just closing.

- December 19-22, 1922, Conference of County Agents, Attendance, 50.
- January 1-Feb. 21, 1923, Series of 10-day Dairy Courses, 24.
- January 19-20, Alumni Day, 115; Polish Farmers' Day, 100.
- March 11, Sheep Shearers' Day, 75.
- May 4, Massachusetts Legislature, 225.
- May 5, High School Day, 750.
- May 12, Phi Sigma Kappa — 50th anniversary, 100.
- May 12, Western Massachusetts Headmasters' Club, 25.
- May 16, Mass. Veterinary Medical Association, 50.
- May 16, N. E. Ice Cream Manufacturers Assn., 35.
- May 19, Parents' Day (Women Students), 21.
- May 26, Western Massachusetts Grammar Masters Club, 25.
- June 14, Executive Committee Mass. State Grange, 3.
- June 15, Directors of Mass. State Chamber of Commerce, 25.
- June 27-29, Agricultural Instructors, Connecticut, 19; Boys' Farm Camp in Sunderland, 30.
- June 23-30, One Week School for Florists, 11.
- July 9-13, Country Clergymen's Course, 32.
- July 17, Middlesex County Club Workers, 75; Boys' Camp, 40; Camp Gilbert, 100.
- July 31-Aug. 3, Conference of Teachers of Agriculture, 70.
- July 24-27, Farmers' Week, 2,500.
- August 1, Hampden County Club Members, 200.
- August 10, Connecticut Pomological Society, 80.
- August 11, Hampshire-Franklin Holstein-Fresian Breeders Club, 60.
- August 14, Permanent Firemen's Association, 110.
- August 18, Agricultural Teachers, Cornell Univ., 14.
- August 21-24, New England Grange Lecturers' Conference, 750.
- August 31, Hampshire-Hampden Forestry Conference, 25.
- September 10, Camp Vail Club Leaders Training School, 15.
- September 17-21, Western Massachusetts Library Club, 80.
- October 5, Executive Comm. Associated Industries of Massachusetts, 40.
- October 12, Mt. Toby Day, 100.¹
- October 18, Governor's Council, 8.
- October 18, Excursion from Springfield, National Council of Congregational Churches, 800.
- October 20, Athol Boys and Girls Clubs, 45.
- October, Delegation from Argentine to World's Dairy Congress, 4.
- November 22-23, Advisory Board State Department of Agriculture, 3.

Visit of the Legislature.

The most important visit to the College during the year was that of the Massachusetts Legislature. Just prior to the opening of the last session, Senator Haigis of Greenfield visited the College, and at that time asked whether we would welcome a visit from the Legislature. Early in the session he introduced an order providing for the inspection. The order was passed on April 11, and the

¹ Visitors.

day set for the visit was Friday, May 4. The legislative session was adjourned in order to allow all members to make the trip to Amherst. A special train composed of steel coaches, left North Station at 8:30 A.M. and arrived at Amherst at 11:40. Here the guests were met by eighty automobiles, placed at our disposal by citizens of Amherst and by alumni in nearby towns. Each automobile was accompanied by a guide who was a member of the staff, an alumnus, a Trustee, or a student. A general tour of the campus was made, thus giving the visitors a comprehensive view of the equipment and extent of the physical plant. This tour of inspection occupied about fifty minutes and was followed by luncheon at the Dining-Hall. Immediately after luncheon the Legislature adjourned to Bowker Auditorium where the platform had been extended to accommodate all the guests. The students assembled early and were in their seats when the Legislature proceeded to the platform. The gallery was well filled with members of the Faculty and townspeople.

Honorable Charles A. Gleason, Vice President of the Board of Trustees, presided. A brief address of welcome was made by President Butterfield, to which responses were made by Honorable Frank G. Allen, President of the Senate, and Honorable B. Loring Young, Speaker of the House of Representatives. From 2:30 to 4:00 P.M. each automobile party, still accompanied by a guide, visited from four to six departments of the institution where some form of class-work was in operation. This plan made it possible for every department to be visited for a sufficient length of time to fully acquaint the members of the Legislature with the research and teaching work carried on. At 4:00 the guests assembled on the Cavalry Riding Field south of the Veterinary Laboratory where bleachers had been provided. Here a parade of the live-stock was held, each animal presented having been fitted for the show by a student. Professor Salisbury, with a megaphone, explained the breed and record of each animal and also gave the name of the student accompanying it.

The last event of the day was a cavalry drill on the riding field. At 5:00 P.M. the special train left Amherst for Boston.

This is the only time since February 1868, that the entire legislature has visited the Agricultural College. 200 out of 280 members were present. Very few of these men had ever visited the College before and practically all expressed surprise at the size of the institution and many voiced their approval of the type of work carried on.

The visit was a significant occasion for the College and one which the officers had long hoped would be brought about. Because so little was known about the College, its interests have been frequently neglected.

To Senator Haigis belongs the credit for initiating the idea of this project and for bearing the responsibility for seeing it through the Legislature. However, many Alumni and friends of the College throughout the State, as soon as they learned that this plan was being considered, used their influence in persuading members of the Legislature that such a trip would be of value to them as well as to the Institution. A number of alumni accompanied the Legislature to Amherst and assisted in entertaining them. Citizens of Amherst contributed generously of their time as well as of their automobiles, in taking the Legislature about the Campus. The students extended a most enthusiastic welcome and provided a box-lunch for the members on the train back to Boston.

The direct expense to the State from College funds was nominal. The Legislature paid for the special train. The automobile service was generously donated. The luncheon and souvenir booklets were paid for from a private fund.

Boys' Camp.

For several years before the war and one year since the war, a Boys' Camp was conducted on our Campus. In previous years the expense to the institution had been rather more than was thought to be justified. However, there has always been considerable demand for a camp of this kind and the interest shown in it by those attending has always been of the best. In 1923, therefore, it was decided to organize a camp on a somewhat different financial basis than previously. Mr. Mellen, Field Agent of the College, who has had ample experience

in Boy Scout work, assumed responsibility for organizing and supervising the camp. The camp opened June 30 and closed July 28. The average registration per week was 25 and the total number of boys was 40. The boys were charged \$10 per week, which covered their board, supervision and incidental expenses. On this basis the camp, from its operating expenses, returned a slight balance to the State Treasury. The College, however, had provided the publicity, the general supervision given by Mr. Mellen, and the tents. With the larger enrollment which is possible without greatly increasing the overhead expense it is probable that the income would exceed the operating expenses sufficiently to offset the time cost of supervision and the publicity.

The camp is designed to appeal to country boys who cannot afford to patronize the more expensive private camps and also to city boys who have an interest in agriculture and outdoor life. The daily camp program includes instruction in agriculture as well as recreation.

The camp this year was well organized and was well supervised and probably, if it is continued, will receive adequate support.

Mountain Day.

On October 12, 1923, there was revived a tradition which has lapsed for many years, namely, that of Mountain Day. This year an outing was planned on Mount Toby where in co-operation with the State Department of Conservation, a 60-foot steel tower has recently been erected. Friends of the College from surrounding towns were invited to join the students and faculty on this outing. It is estimated that about 800 were present. Following the luncheon at the summit at 12 o'clock, there was a brief program of speaking by President Butterfield and Honorable W. A. L. Bazeley, and a pageant written by Professor Frank P. Rand of our English Department was acted by students and members of the staff.

This affair so thoroughly commended itself to the students and faculty that it is expected to become an annual event.

Recommendations for Legislation.

Two Amendments to existing laws are recommended by the Trustees.

1. FEED LAW.

Be it enacted, etc.

That section two hundred and twenty-seven of chapter ninety-four of the General Laws of the commonwealth, as amended by act of legislature in chapter four hundred, nineteen hundred and twenty-two, be changed by omitting the word "twenty" from line nine and substituting therefor the word "fifteen", so as to cause this line to read, "Pay to said director or his authorized deputy a registration fee of fifteen dollars."

The purpose of this Amendment is to reduce from twenty dollars to fifteen dollars the brand fee charged for the collection and analysis of commercial feed stuffs. The reason for recommending the change is that the present tax is higher than is justified by the work done. The appropriation for this work for 1923 was \$9,000. The appropriation request for 1924 is \$9,500. The income from the brand tax in 1923 was \$19,420.

2. PUBLICATIONS.

Proposed Amendment to Section 9, Chapter 7, of the General Laws of Massachusetts.

The above section should be changed to read as follows:

"This section shall not apply to publications issued by the officers of either branch of the general court, or issued under special authority given by the general court, or to the regular annual reports of the attorney general, state treasurer, or state secretary, or to publications reporting results of research work conducted by the Department of Education through the Massachusetts

Agricultural Experiment Station, or to reports of capital trials prepared by the attorney general under Section 11 of Chapter 12, or to publications prepared by the state secretary in conformity with Sections 2 and 4 of Chapter 5".

This in effect adds the research publications of the Massachusetts Agricultural Experiment Station to the list of exceptions previously recognized. This is necessary in order that the effectiveness of the Experiment Station as a research institution may be maintained. An essential requisite in the work of any research institution is certainty of publication without fear or favor, and in such a way as to make the author or the research worker fully responsible for the character, accuracy and efficiency with which the work is done. Any method of state control which prevents publication, or which through its editorial policy may prevent effective publication, may vitiate the results of the work, and make unproductive the expenditures of time and money, for such work. For all of these reasons, therefore, an exception to the general ruling should be made in favor of the Agricultural Experiment Station. This exception, however, should not be considered to include those publications of the Experiment Station which are other than *bona fide* reports of actual research work.

Occupations of Graduates.

The occupations of the graduates of our four-year course is still a subject of considerable discussion among those interested in the college. On the basis of returns received within a year, an analysis has been made of the occupations of alumni for the past twenty years, namely the classes of 1903 to 1922, and from this analysis the following statistics are compiled:

Occupational Classifications of Graduates based on Statistics collected 1923.

Classes 1903 to 1922, inclusive.

	Number.	Per Cent.
Living graduates whose occupations are known . . .	1,190	
Agricultural Vocations		
Farm Operators, including market gardeners . . .	251	21.09
Landscape gardeners, foresters and florists . . .	96	8.07
Agricultural College administrators and teachers . . .	79	6.64
Agricultural school administrators and teachers . . .	60	5.00
Experiment Station administrators and experts . . .	27	2.27
Extension Service administrators and experts . . .	37	3.11
State agricultural experts	32	2.69
U. S. D. A. administrators and experts	53	4.45
Agricultural business	69	5.80
Miscellaneous agricultural experts	59	4.95
Total	763	64.12
Non-agricultural vocations		
Business	211	17.73
Engineers	46	3.86
Physicians	18	1.51
Teachers	93	7.81
Miscellaneous	59	4.95
Total	427	35.88
Unknown occupations	97	

IMMEDIATE PROBLEMS.

The Question of Expansion and Support.

THE PRESENT BUDGET. — For some years it has been the policy of the State Administration to discourage expansion in our work. We have realized the need of economy and as a consequence have not pressed for large developments. In the present budget, for example, we are not asking for major buildings,

much as we need them; but we do wish to secure special appropriations sufficient to enable us to carry out a number of comparatively small projects for equipment, some of which have been repeatedly requested by departments for periods ranging from two to six or eight years. We are seeking only a slight increase in the budget for maintenance of instruction. In our Extension Service we should have a few new positions on the staff to permit us to meet demands that are coming to be very pressing and that will round out the scope of our service for the period of the next few years at least. It is an unfortunate fact that the Extension Service has been getting progressively smaller sums for maintenance for several years past. The assumption at the State House seems to be the fallacious one that the work of the County Extension Service will gradually make unnecessary the work of the State Extension Service. A really serious phase, however, of our failure to expand lies in the field of the Experiment Station. True, last year three or four new staff positions were granted; but there should be established at least ten more new positions in the immediate future. There is no need to argue with you the importance of investigational work; but I do desire to stress the necessity of early and substantial increases in our equipment for research. We are not keeping up with the demands of the situation.

THE FOOD SUPPLY CAMPAIGN. — Some years ago, we at the College began to think rather seriously of the fact that it was becoming more and more difficult to advise the farmers of Massachusetts with respect to their long-term policies, until we know more about the market for their products — that is to say, until we knew more about what the food consumers of the State require and where they get it. We discovered that certainly not more than 15% and possibly not more than 10% of the food consumed in the State was grown in the State. We were obliged to ask ourselves, "To what extent and in what lines of agricultural endeavor is it probable that the farmers of Massachusetts can compete with farmers in other parts of the country and of the world?" Thus we were led inevitably toward the consideration of such questions as marketing, transportation, and storage. But we could not stop even there. Problems of waste induced us to consider food conservation. Finally we perceived that we must understand human nutrition and the dietaries of consumers. And then we found that so closely inter-related were all of these matters that we had virtually one unified problem — the problem of the Massachusetts Food Supply. And we said to ourselves "Here is *our* task. We are convinced that we cannot do the best for the farmers unless we compass the entire problem. Moreover, here is something, growing out of the agricultural character of our college enterprise, that concerns every person in the Commonwealth."

The full realization of this enlarged conception of our work probably came during the war. As far back as in my report of 1917 I outlined the problem of food supply, stating, at the time, that this now seemed to be our field. Some three years ago you authorized me to proceed to try to interest various groups of citizens in the larger function of the College. It seemed wise to try to make clear to these groups that the College is the concern of all people of the State; that its field includes the food supply problem; and that this problem is one of the major economic questions of our time. My absence in China prevented an earlier carrying out of your authorization, but during the past year we have definitely been in touch with the Grange, with the State Chamber of Commerce and many city Chambers of Commerce, with The Associated Industries, with representatives of organized labor, with the State Federation of Women's Clubs, and with many Rotary and Kiwanis and similar business men's clubs. We have lectured before these groups on the food supply problem and the relation of the College to it. We are now preparing literature for distribution by these organizations. We have had visits to the College from the official executive bodies of most of these groups, and under your authorization a bill has been drawn providing for an unpaid Commission on Food Supply, whose duty it shall be to begin at least a study of the food supply of Massachusetts in all its various aspects.

All this procedure is most significant with respect to the purpose, work, and development of the College. It is frankly an enlargement of scope, but one wholly germane to the agricultural character of the institution. It will eventually mean a substantial increase in work and equipment. The food supply problem will doubtless call for prolonged research. Very soon will come a demand for trained specialists in marketing and other similar phases of the work. We will be required through our Extension Service to assist in reaching every home in the Commonwealth. In my judgment, all of our agricultural colleges will in time attempt to cover this entire field; at present we are the pioneers. I hope that the people of the Commonwealth, who are now undoubtedly becoming aroused to the significance of the food supply question and the need of educational work and especially of investigation with respect to it, will permit us to assist in its solution, as we can if we are given the facilities of equipment and staff.

EXPANSION IN EDUCATIONAL SCOPE OF THE COLLEGE. — When the Commission on Higher Education visited the College about a year ago, we laid before them three suggestions to which we hoped they would agree, as representing the relation of this institution to the system of higher education in the Commonwealth: (1) that nothing should be done now or later to restrict our work as a College of Agriculture; (2) that we should be definitely allowed to expand our work to include the whole field of food supply — production, conservation, market distribution, and food utilization — and with respect also to our full service in the three phases of work that we are obligated to perform, namely, investigation, the training of specialists, and extension teaching; (3) that if it seemed wise to utilize our equipment for service beyond these two fields, the courses to be developed should grow out of other applications of those natural and social sciences which we must have as a basis for agriculture, country life, and food supply. This statement we considered “official” in the sense that it pretty clearly represented faculty opinion, and we had reason to think also the views of your Board of Trustees.

In addition to these suggestions, various members of the faculty handed to the Commission memoranda expressive of individual views. Personally I have some convictions concerning this whole problem of higher education in the State, but doubt whether this report is the place for publishing them. Moreover, at this writing the report of the Commission has not been made public and I do not wish to anticipate that report. I feel, however, quite keenly that the time has come when our College should be allowed to broaden the scope of its work somewhat beyond the fields of agriculture, country life, and food supply, and on the principle enunciated in our suggestions to the Commission. I have arrived at this conclusion with much personal reluctance because, as you know, I have always maintained that this College should be nothing but an agricultural college. But I think it is evident that the State will be asked to provide increasing facilities in higher education, and whatever plan is followed in this development there is no avoiding the conclusion that the Massachusetts Agricultural College should be fully realized in that plan.

I should like to call attention to a sentence in the Morrill Act of 1862, which is virtually the charter of our College as it is of every other similar institution in the United States. That part of the Act which describes the purpose of the institution, is as follows:

“The leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”

As a rule, that part of this statement of purpose usually emphasized is the first part, and seldom have we discussed the full meaning of the words “the education of the industrial classes in the several pursuits and professions of life”. But *the whole contention of the advocates of enlarged facilities in higher*

education in Massachusetts today is based largely on the plea that the boys and girls from the homes of the industrial classes are not getting their chance. Here is our charter, at our very hand, authorizing us to enlarge our scope, in order that the sons and daughters of the industrial classes of this great industrial Commonwealth may have a fuller chance for such higher education as they are capable of and for any occupation that they want to enter.

NEW COURSES. — I wish to recommend that steps be taken to secure whatever permission may be necessary from the legislature to enable us to start three new courses, if possible the coming autumn.

(1) *A Course in General Science.* — We have many students already with us, and there are many more high school students who do not come to us because we do not offer this course as yet, who are uncertain as to the particular occupation they would like to pursue, but who wish to secure a rather general education which will be largely composed of work in science, rather than in language and literature, and which will form an adequate foundation for the pursuit of vocations connected with the industries and business dominant in Massachusetts. We could easily formulate a general science course with subjects already offered. Any additional costs involved would for the present be almost wholly due to an increased number of students.

(2) *A Teachers' Course.* — We already have a strong department of agricultural education, which with the addition of possibly one or not to exceed two instructors, could care for some while for the pedagogical work necessary to train high school teachers of science, both men and women. There is a large field here which we have entered very slightly because of our previous emphasis upon the agricultural aspect of education. This course should also include the training of high school directors of athletics and physical education.

(3) *A Course in Home-making.* — Here again we have nearly all the material already at hand, though we should need soon two or possibly three more instructors, because thus far we have not been allowed to develop our home-economics work on a four-year basis. I should like to make it clear that we need not feel compelled to offer a highly specialized course in home-economics except as future demands may come, but rather a general course for women in which the home-making elements shall receive adequate attention. There is no reason why women should not continue to take work in agriculture and in science. Many will undoubtedly elect the proposed new courses in general science and for teachers; others, and I think the majority, will eventually wish to follow a specially organized course for women in which home-making will play a significant part.

All three of these proposed courses follow the principle already indicated, namely, that we would utilize existing offerings in the course of study and thus reduce added institutional costs to very slight terms. In other words, with a minimum increase in our "over-head" we can develop some very important opportunities for the youth of Massachusetts. It is true that if these new courses should attract students in large numbers the cost of maintaining the institution would increase, but there would be small increase due to the mere fact of multiplying courses. In no other way, so far as I can see, can the State so economically provide new opportunities for its youth along certain lines.

Moreover, these new courses are in harmony with what in my judgment should be the fundamental principle of our expansion, namely, the development and maintenance of the *liberalized occupational course* — a course that frankly prepares for occupation, and yet which recognizes that occupational preparation is by no means wholly a matter of technical knowledge, and cannot fairly exclude suitable training for citizenship and for individual mental and moral development. At first thought it may seem as if the proposed course in general science would not fall in with this principle; but I think this course should be very definitely foundation work for occupation, although the student need not specialize in any single occupation while following undergraduate studies.

THE RELATION OF THE COLLEGE TO THE STATE ADMINISTRATION.

During the past year we have been in frequent contact with the new Commission on Administration and Finance. All of our requests have received consideration and the members of our staff have been given courteous personal treatment. We are not, however, reconciled to the essential unsoundness of the present scheme of centralized control of expenditures. Several decisions of the Commission this year have been particularly trying. Three bulletins of the Experiment Station have been refused publication. As you are aware, you have already authorized the preparation of a bill intended to exempt the State Experiment Station from the provisions of the law that gives the Commission on Administration and Finance control of publications. We have had also, in recent months, an unpleasant illustration of the way in which the Commission can control fundamental policies. A vacancy in the office of Nutrition Specialist in the Extension Service, which we asked to be filled early in September, has not been filled because the Commission at first questioned the policy of our continuing the work so long as the State Department of Health also had a nutrition worker. Our Nutrition Specialist was an office established a number of years ago, under a joint agreement with the United States Department of Agriculture and does work practically required under the Smith-Lever Act of Congress, which the legislature of this Commonwealth accepted. On general principles, furthermore, if there be real duplication of work, no administrative agency in the Commonwealth should be permitted to do educational work that in the very nature of the case belongs to the College. A further ruling of the Commission apparently indicated their willingness to allow the position to stand but materially reduced the salary. We appealed to the Governor and Council and the matter is still pending.

Now, Gentlemen of the Trustees, this sort of procedure simply cannot go on if you desire to maintain the morale of the staff and if you expect the institution to do its work economically and efficiently. I do not like to continue to protest against the present methods, as I have done every year since the system was established. Because of the fact that we are still maintaining our work and that we have lost comparatively few from our staff, it may seem to you that we are becoming reconciled to the law and the administrative rulings and that the issue is not serious. On the contrary, it is most serious. I cannot exaggerate its seriousness. I assure you that many of us who come into closest contact with these administrative relationships have reached nearly the limit of our endurance.

The essence of the reform we desire is that you as a Board of Trustees shall have your power of control of the College restored to you, that it shall be specifically recognized that neither the Commissioner of Education nor the Commission on Administration and Finance shall have more than advisory and recommendatory powers. We concede the value of the State Budget system, though in our judgment the number of classified items in our part of the Budget should be greatly reduced, if indeed the one item for the College may not suffice. We think the law should be changed to permit the Trustees to decide upon the extent to which members of the staff may travel outside of the State at State expense, and a law enacted which will permit the earnings of the institution to be at once reappropriated for its use. We believe that the Trustees should have full power to decide the scope of our work; the type of expenditures that are justifiable; to employ members of the staff and to fix their salaries. We believe that this power should be final and not subject to veto on the part of any of the other State officials.

There is no question but all these powers should be held by the Trustees subject to legislative authority and to such checks, accounting, and reviews as may be demanded by sound public policy.

MASSACHUSETTS AGRICULTURAL COLLEGE LEGISLATIVE BUDGET 1924.

Projects for Permanent Improvement.

1. TUNNEL FOR STEAM LINE FROM POWER PLANT TO STOCKBRIDGE HALL, \$39,000.

The principal argument advanced in support of this project is the recommendation made by French and Hubbard, engineers, who recently made a study of the present heating plan and future development for the same, "that a tunnel be constructed to Flint Laboratory and Stockbridge Hall and the piping arranged so that exhaust steam can be used in these buildings. We are firm believers in tunnels for steam mains of this kind, and believe that when it is necessary to rearrange the underground piping, tunnels should be constructed. We would recommend this both for economy in the long run and on account of convenience in repairs and pipe insulation."

At present none of the underground steam lines are enclosed in tunnels. The result is a high cost of maintenance because of the excessive radiation and because of the difficulty in locating and repairing leaks. Also, at present, the maximum use is not made of exhaust steam; this latter difficulty would be met by the project here outlined.

2. HORTICULTURAL MANUFACTURES LABORATORY AND EQUIPMENT, \$60,000.

The importance of utilizing various by-products of the farm which formerly were wasted, such as fruit and vegetables, was emphasized during the war, and under the direction of Prof. W. W. Chenoweth of this institution farmers came to see whereby this saving could to advantage be made permanent. In order to give adequate instruction in the preservation of fruit and vegetable products, a new laboratory building is essential. The plans provide for a one-story building of inexpensive construction, which will furnish laboratories for the various phases of this work.

The pressing need for this building is now generally understood. However, some of the principal considerations may be recapitulated as follows:

(a) The department of horticultural manufactures now has its work widely distributed in four buildings, viz. Flint Laboratory, Wilder Hall, French Hall, and a workshop on the hill near the cold storage plant. This wide scattering of the work is obviously very detrimental to its objective.

(b) The principal teaching is done at Flint Laboratory in rooms which were designed for the use of the dairy department. The dairy department needs these rooms and would like to see the department of horticultural manufactures cared for elsewhere as soon as possible.

(c) The present quarters are entirely inadequate for the teaching work. On account of the limited space the department has been compelled to refuse admission to numbers of students. This is perhaps the only department in the institution which has been compelled frequently to refuse admission to students on account of lack of space. All the teaching could be much better organized and more efficiently conducted in a new building designed for this particular work.

(d) It is highly desirable that vigorous research work be undertaken at the earliest opportunity in the field of fruit and vegetable preservation and the manufacture of by-products. A strong demand exists for this work among fruit growers, but the subject is equally important to all consumers of food in Massachusetts.

(e) The department is now carrying on important extension work, but these extension projects need to be strongly supported by effective work at the college, and especially by well-directed research work.

(f) The Massachusetts Fruit Growers' Exchange Association, the Boston Market Gardeners' Association and other organizations have urgently requested this proposed building. This demand from the fruit growers and vegetable growers should be squarely met.

3. MISCELLANEOUS BUILDINGS AND IMPROVEMENTS IN ACCORDANCE WITH SCHEDULE BELOW, \$34,650.

(a) *Tobacco Barn, Brooks Farm, \$5,000.* — One of the experimental projects to which attention has recently been given is that of cultural problems of tobacco. A section of the farm is used for growing tobacco and a barn for drying tobacco is necessary.

(b) *Tillson Farm: House for Foreman, Shop and Storage, \$5,500.* — These additional improvements at the Tillson Farm are necessary to more adequately conduct the experimental work in Poultry Husbandry carried on there.

(c) *Buildings at the Farm: Calf Barn, Piggery, Storage and Granary, \$10,000.* — These minor buildings are requested in order to provide much needed facilities on the College Farm.

(d) *Head House for Agronomy Greenhouse, \$2,650.* — This appropriation is requested in order to supplement the laboratory facilities in connection with instruction in soils and crops.

(e) *Culvert over Brook in Ravine for Coal Storage, \$2,500.* — With the prospect of the winter coal supply for the College being delivered before the first of December, it is necessary that the space for storing coal be enlarged. By building a culvert over the brook, which runs near the present coal storage it will be possible to store the amount of coal necessary during the portion of the winter months.

(f) *Land for Cranberry Station at Wareham, \$1,000.* — This appropriation is requested for the purchase of about sixteen acres of land contiguous to the cranberry Station at East Wareham, for the purpose of providing an opportunity for an increase in experimental work with blueberries, for variety testing of cranberries, and other experimental work of a similar nature. A part of this sixteen acres is adjacent to a pond, and is a favorable site for the construction of a second experimental bog. Another part is well suited to the extension of the commercial blueberry work, while the remaining area is needed both for straightening the boundary of the present plant and to serve as a source of upland peat, sand, and fuel.

(g) *Storage for Winter Vegetables, \$3,000.* — In order to demonstrate the advantages to be derived from community storage for winter vegetables it is proposed to erect on the grounds of the college, a building which will not only store the vegetables produced at the college but also serve as a demonstration to communities interested in a similar project.

(h) *Fencing Fruit Plantation, \$3,000.* — Because of lack of funds, the fencing of the large fruit plantations owned by the college has been deferred. As a result, a good deal of fruit is stolen each year in spite of the fact that the orchards are protected by a watchman during the season when the fruit is ripening. The expenditure of the sum here indicated would seem to be justified on the grounds of economy.

(i) *Vault, Basement of Library, \$2,000.* — While it does not seem advisable to request at this time, any large appropriation for Library improvements or for the construction of a new building, it is important that a small fireproof vault be provided in the basement of the present building in which may be stored certain historical records and memorabilia of the College, many of which are of large value.

4. ADDITION TO RURAL ENGINEERING BUILDING, ONE UNIT, AND EQUIPMENT, \$17,500.

The demand for instruction in Rural Engineering has greatly increased during the past four years. The Two-Year students in particular elect this work in large numbers. In view of the fact that such a large proportion of the instruction is given in laboratories, it is essential that in the interest of economy as well as convenience larger laboratory facilities be provided. In the opinion of the head of the department, the present laboratory and shop should be double in size; the appropriation here indicated would provide for an increase of 50% in the floor space of the existing facilities. This additional space would be used for instruction in the care of motors, farm machinery, and in the making of concrete, and for the display of farm machinery and other equipment.

5. ROADS AND WALKS, \$10,000.

The College is responsible for the up-keep of approximately two miles of road running through its grounds, a road which is used constantly by the public. In 1923 approximately 1,700 feet of this road were rebuilt by an appropriation granted by the legislature of 1923 and under the supervision of the State Department of Public Works. An appropriation of \$2,500 has also been used for the rebuilding of a portion of the main walk at the entrance of the campus.

Prior to the outlay of 1923, practically no money has been spent for either roads or walks for many years. It is desirable that the main roads and walks be rebuilt as rapidly as possible. In order to make progress in the carrying out of this plan, an appropriation of \$10,000 is requested for 1924, for the extension of the work already appropriated in rebuilding the present roads and walks on the campus.

6. BUILDINGS FOR MARKET GARDEN FIELD STATION AT WALTHAM, \$25,000.

The trustees of the will of the late Cornelia Warren have deeded to the College about fifty acres of land located near the Clematis Brook railroad station in Waltham. This area is admirably suited for experimental work with vegetable crops. There are about twenty-three acres of level, uniform, well-drained, upland soil naturally much better adapted for experimental purposes than is the present area at North Lexington; and about fifteen acres of peaty, swamp deposit, typical in many respects of the area of wet land now being reclaimed in many different parts of the State, primarily as a health measure, but potentially of great importance to agriculture.

In addition, there is a farmhouse, which may be remodeled to serve as living quarters for the Field Station foreman, and likewise as administrative headquarters for the plant. There are a number of other smaller buildings, some of which can be utilized, others of which may have to be wrecked.

The opportunity for more thoroughgoing investigational and demonstrational work in vegetable growing is so apparent that the trustees of the college have gladly accepted this gift. The sum of \$25,000 is needed to cover the cost of the initial equipment at the new Field Station, in order that work may be started in the late fall of 1924. This appropriation is needed to erect a thief-proof wire fence around the plant, to care for the remodeling and moving of one of the smaller buildings now on the place to serve as service headquarters; to build a greenhouse range and heating plant; and to make preliminary repairs on the house and other buildings. In addition, small appropriations will later be needed to care for the draining of the swamp and to make other improvements.

It is expected that receipts from the sale of the North Lexington property will be approximately \$20,000. In effect, therefore, the initial cost to the State of the much larger plant at Waltham, a total of fifty acres as against twelve acres, with increased opportunity for effective work, will be approximately \$5,000.

KENYON L. BUTTERFIELD,
President.

ANNUAL REPORT OF THE ACTING DEAN FOR YEAR ENDING 1923.

The college year 1922-23 opened very auspiciously. The entering class numbering 187 was the largest since the war and from the standpoint of scholarship and general attitude proved to be one of the most satisfactory that ever entered the college.

Following our usual practice each new man was assigned to an adviser. The advisers are all teachers of Freshmen and are, therefore, fully acquainted with the courses which Freshmen carry and the requirements which have to be met. Whenever any scholastic report is made to the Dean's Office, the same is placed in the hands of the student by his adviser who in this way has an unusual opportunity to counsel and direct the individual student.

The chief value of the system lies in these personal contacts between broad, human, sympathetic members of the faculty and their advisees. The adviser

must command the respect and issue the invitation to friendly intercourse, but the student must accept these overtures and discuss his problems frankly.

The adviser is not a private tutor, nor an administrator with powers usually entrusted to the Dean; nor is he functioning in a system devised to save inferior or unworthy students from dismissal. But his main job is to help the new student to make, with the least possible jar, the transition from a life closely supervised to one that is pretty largely self-regulated. It is the duty of the college to render service at this point.

The members of the staff who assisted the Acting Dean in advisory work during the year were Professors Patterson, Skinner, Rand, Julian and Messrs. Thissell, Bogholt and Porter. Their efforts in behalf of the men assigned to them caused much favorable comment. They deserve especial credit in view of the fact that they were willing to take on these additional duties when they were already pretty well crowded by a heavy teaching schedule.

The scholarship record of the members of the three other classes was reviewed at regular intervals by the Acting Dean and personal conferences arranged in all cases where the work was not satisfactory. In general the scholarship situation showed a gratifying improvement. The number of conditioned and failed courses was less than we had for many years. Through the year about ten per cent of the new men were dropped because of failure in over forty per cent of their work. Considering the number of men involved and that some of these failed were admitted on probation, we have reason to feel that the record is a fairly creditable one.

For the first time in the history of the college, individual photographs were taken of all the Freshmen. These are used by the Dean, the Registrar, and the President and form a part of the permanent record of each student. Their value to administrative officers is almost indispensable and the practice will undoubtedly become a permanent one.

It is a pleasure to call attention to the fact that the year was almost entirely free from grave or threatening student disorders. The "periodic grouch" was conspicuous by its absence. In speaking of the general situation, President Butterfield referred to it in this way: "My feeling is that we have had an unusually good year; as I see it, the best since the war. There has been splendid leadership in the various student activities, a fine spirit of co-operation, a number of progressive measures suggested by the students themselves, and above all an atmosphere of community friendliness and co-operation that is highly gratifying. It occasionally happens that some time during a college year, it seems necessary for students to ventilate some 'grouch' or other, so far as I can recall, this year has been entirely free from anything of the sort."

This kind of spirit somehow grows and thrives when a group of loyal, well prepared and well intentioned students seek to profit by the direction and instruction of an equally loyal, well trained and sympathetic faculty. Surely every effort for good scholarship and satisfactory student conduct must concern itself with all those factors in college life which aim to make every student a contented student so far as possible.

Miss Grace Gallond, our chief clerk, in fact the only clerk we have had since last fall has proved her worth in many ways. She is capable, tactful, and handles the innumerable details connected with absences, appointments and records in a highly acceptable manner. Her fair and straightforward dealing with students has made a good impression. Some way ought to be found to relieve her of some of the minor duties which crowd in on the more important work that would more than comfortably fill her day.

Several modifications of absences' regulations were tried out with good success. Plans have been drawn up and approved for withdrawing the cut privilege from Freshmen. This will go into effect with the class of 1927. We feel very sure that with our present organization and teaching methods, a student loses a great deal if his attendance is irregular. Then, too, it is evident that practically every student enters upon his college work in a rather serious frame of mind. He really wants to succeed. The college does well to make capital of this fact to help him in forming correct habits when he is beginning self-discipline through responsibility.

As to needs, first and foremost come dormitories. We at least should have facilities to house the Freshmen. A great deal of our work could be made more effective if we were able to reach our men more easily. With students scattered all over town in private homes, it is manifestly often impossible for us, under even the best supervisory organization, to learn of discouragements, associations, and conditions early enough to make our remedial work really effective. Any one knows how much clean, handy, and well adapted rooming places contribute towards making a contented student. We hope these dormitories will be provided in the near future.

During the year representatives of the Student Senate, the Inter-Fraternity Council and Adelphia met with the Scholarship Committee for the purpose of working out plans which would help the scholarship of the college generally. Considerable progress was made and some of the recommendations made at the joint meetings have already been put into effect. This co-operative endeavor will undoubtedly bring good results.

WILLIAM L. MACHMER,
Acting Dean.

REPORT OF THE DIRECTOR OF THE GRADUATE SCHOOL.

It is with much satisfaction that I have the privilege of reporting the steady and progressive increase in the effectiveness of the Graduate School. This is due to the wholesome and strengthening influences prevailing in the departments offering graduate work.

What is done and can be done for the development of advanced study in agriculture, whether it be from the scientific approach or in its so-called practical bearings, rests with the growth of the specific fields of activity within agriculture and a free understanding of the significance of each in its relation to the whole. I believe that those who have the direction of graduate work in any of its forms have this grasp of the situation.

Much consideration has been given to the liberalization of graduate study during previous years with the result that some experiments have been tried and others are in progress. This seems to be a subject receiving some thought in all graduate schools. Linked with it is the character of undergraduate preparation which may be seemingly of any nature. This situation throws into the graduate schools preparatory study for the pursuance of advanced study. No two individuals have had exactly the same preparation, accordingly each individual requires specific adjustment. Liberalization, undergraduate preparation, and graduate study of an effective kind go hand in hand in mapping out a course of action although graduate study is very different from our present system of undergraduate study.

CHARLES E. MARSHALL,
Director of the Graduate School.

REPORT OF THE DIRECTOR OF SHORT COURSES.

New Courses.

During the past year several new short courses were offered. A series of four, two-weeks courses for experienced dairymen, managers of ice cream plants, milk producers and others were given with marked success by the Dairy Department. The attendance was very satisfactory and the comments made on the course favorable. These short courses differed, in that the student devoted all of his time to practically one subject. The Division of Horticulture inaugurated a ten weeks course in general horticulture for experienced nurserymen. This course was given in co-operation with the New England Nurserymen's Association, the Massachusetts Nurserymen's Association and the Connecticut Nurserymen's Association. Though the attendance in this course was not large, it proved very satisfactory both to the staff and to the student body.

No short courses were discontinued during the past. The work of rehabilitation of disabled veterans of the world war is practically now complete. In the fall of 1923 there were but two federal trainees entering the freshman two-year class.

Supervision of Farm Projects.

At the special request of the Veterans Bureau, the Massachusetts Agricultural College undertook the supervision of farm projects carried on by federal trainees under the authority of the Veterans Bureau. These trainees are usually veterans who have pursued courses in agriculture in this or other colleges and who have now undertaken to put to practical application the knowledge so gained. Three men are employed in the work of supervision for the Veterans Bureau. Mr. George Goodridge, a graduate of this college in the class of 1918. Mr. F. L. Hannaford, formerly employed by the District Office of the Veterans Bureau in Boston. Mr. H. F. Williamson, formerly employed by the State Institute of Applied Agriculture in Long Island. In making provision for advising and counseling with men who have completed their training and who are about to engage in practical work, the Federal Government has taken one of the most forward steps in recent years in agricultural education. Students who have completed a short course of instruction in agriculture and who wish to engage in farming face two problems, credit and expert guidance. Sometime, somewhere provision will have to be made for capitalizing the honesty of ambitious young men who wish to take up farming, and of providing for them such expert supervision as will help insure their chance of success.

Attendance in Courses.

The attendance in all short courses is less than in previous years. Recently obtained figures indicate that this condition is not local but that there has been a sharp falling off in registration in agriculture in many of the agricultural colleges due to the agricultural depression and to the high wages now being paid in other industries.

Supervision of Placement Training.

The supervision of farm placement training has been carried on very efficiently by Paul W. Viets, Supervisor. It is very likely that by next year we shall have to have an assistant to Mr. Viets in this work.

The following tables are included showing enrollment in the Two-Year Course:

A. *Total Yearly Enrollment of Each Year based on Enrollment from September to June.*

	1918.	1919.	1920.	1921.	1922.
Two-Year Course	37	209	295	302	274
Ten Weeks' Winter School	91	63	112	83	84
Summer School	68	238 ¹	322 ¹	353	127
School for Country Clergymen	—	—	—	19	34
Vocational Poultry Course	5	13	19	26	4

¹ Includes students sent by Federal Board for vocational education.

B. *Age Distribution of Two-Year Students based on Total Enrollment from September to June.*

AGE (YEARS).	1920-21.		1921-22.		1922-23.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
16	—	—	—	—	—	—
17	21	7.1	16	5.3	12	4.4
18	34	11.5	26	8.6	20	7.3
19	35	11.9	44	14.6	45	16.4
20	38	12.8	41	13.6	44	16.1
21	27	9.2	25	8.3	26	9.5
22	26	8.9	18	5.9	19	6.9
23	21	7.1	18	5.9	15	5.5
24	16	5.4	15	5.0	13	4.7
25 and over	77	26.1	99	32.8	80	29.2
Total	295	100.00	302	100.00	274	100.00

JOHN PHELAN,
Director of Short Courses.

REPORT OF THE DIRECTOR OF THE EXPERIMENT STATION.

The year just past has in general been one of progress. There were no resignations of men holding key positions, and few changes in other positions. The appropriations made by the Legislature of 1923 made possible the strengthening of work in at least three departments, and while rigid economy has been practiced as a matter of general policy, yet amounts available for maintenance were sufficient to give a fair degree of elasticity to the work of most of the departments. The character of the season was such that the producing departments were able to complete their season's program at less than expected cost. In all these respects, therefore, my report is entirely favorable.

Aside from inability to match development of our men by corresponding increases in salaries, the only present serious difficulty in the Station organization has to do with publication of the results of research. Financially this is a small matter, as less than 2 per cent of this entire research budget of the Station is expended in publication. Its present importance lies in the fact that under provisions of State Law all manuscripts submitted for publication at State expense must be approved by the Commissioner of Administration and Finance. This in effect gives to the Commissioner editorial supervision over research publications, something which was probably not contemplated when the law was passed.

During the past year approval on three manuscripts submitted for publication was refused. Decision on several others was withheld over a period of weeks, and in one case months. Requests for information as to the status of these manuscripts have not been answered. As a result the publication program of the year has been wrecked. At the present time the Station Director is unable to give any assurance to members of the staff regarding the possibility of publishing results of completed work. He is not able to so time publications as to make them most timely and most serviceable. Effective co-operation with other agricultural experiment stations and with the United States Department of Agriculture is made exceedingly difficult.

Consideration of the above problems calls attention to the fact that very few people have any adequate understanding of the various ways in which agricultural research work is capitalized. The thought most commonly expressed is that the work is primarily addressed to farmers, and to farmers alone. It is therefore worth while to point out some of the ways in which experiment station work in general, and the work of the Massachusetts Station in particular, is capitalized, and the ways in which it finally brings returns to the people of the State.

A part of the work of the Experiment Station results in immediate possibility of improved farm practice. In such cases the report of the work is and should be rendered directly to farmers. The work of the Department of Botany in studying apple scab control, as carried on in the eastern part of the State; much of the work of the Cranberry Station; and that work of the Department of Agriculture which had to do with the use of fertilizers, find a place in this classification.

In other cases agricultural research affects farmers indirectly, through the medium of products sold for use on the farm. A recent case is that work of the Department of Pomology which resulted finally in the development of a nursery certification plan. Through certification it is now possible to avoid those losses which formerly occurred through the use of misnamed nursery stock. In order that the foundation research work might be fully capitalized, it was necessary on the one hand to show to orchardists the value of certified nursery stock; and on the other hand to demonstrate that the production of such stock would probably be profitable to nurserymen. In this particular case the final report of the research was published with both the farm and the nursery audiences in mind.

The work of the Department of Plant and Animal Chemistry, extending over a period of many years, illustrates a still more complex situation. This department has carried on more investigations in the study of digestibility of cattle feeds than has any other organization. To a limited extent the work is used

directly by farmers, and to them are addressed some of the reports of our research work. A much wider field is ultimately covered, however, in that the results of these studies are incorporated in nearly all standard texts on the feeding of farm animals. Finally, this work has been studied by the manufacturers of commercial feeds, and utilized in a very large way. A commercial industry, therefore, serves as an intermediary between the Station and those farmers who buy the products of this industry.

In other cases, it may be, research work is primarily of value in giving a basis for regulative work on the part of the State or Nation. In this classification comes the comprehensive study of bacillary white diarrhoea of poultry as made by our Department of Veterinary Science. Only through the organization of regulatory work on a comprehensive basis could this work be capitalized so as to be of value to poultry keepers, and through them to the consumers of poultry products. Already, as a result of this basic work, Massachusetts has a most efficient working plan for controlling and eliminating this destructive disease. Other states, through means of the published record of this investigation, are following the lead. The published report of the experiment was addressed to scientific workers alone, particularly those laboring in the field of avian pathology—yet poultry farmers in this and other states are now benefiting immensely.

Finally, it must be recognized that many problems undertaken by the Experiment Station may have subsidiary by-products which are of service to agricultural science even though they may be of no concrete immediate value to agriculture. A fact once established must be published in order that it may be made a matter of easily accessible record. Failure to publish means that the work must be done over again by some other person in some other place, with a probable net loss to the agriculture of the country because of the facts not being fully recorded. Particularly is this the case in the developing study of the economics of the food supply of the State. Not until methods of study become standardized and much preliminary work is done, will it be possible to insure that all efforts along research lines be fully productive. The State, however, expects to learn from the experience of other states. In its turn, other states must be given opportunity to learn from the experience of Massachusetts.

One of the most pressing needs of the Station is a definite publication policy which will insure that all the work of the Station be productively and consistently recorded.

SIDNEY B. HASKELL,

Director of the Experiment Station.

REPORT OF THE DIRECTOR OF THE EXTENSION SERVICE.

At the close of the State fiscal year ending November 30, 1923 I am able to report excellent progress in extension accomplishments, but I feel obliged to report great discouragement concerning prospects.

Accomplishments include the carrying forward of our projects on the general lines planned at the beginning of the year. The wage-competition of industry, particularly contract construction work, has been more keen and more disastrous to agriculture than at any time during the war. More farmers have yielded, and given up agriculture for other occupations than at any other time. On the other hand those farmers who have reorganized their business to meet present opportunities have had a good year. The industrial pressure has hastened the transition from the former type of general agriculture to the newer specialized type. The change was due to come anyway; it only comes more suddenly and violently.

It is more evident than ever that certain types of agriculture, such as sheep raising and hog raising on purchased feeds, are of the past. Certain other lines, as fruit growing and poultry raising, can expand very greatly before market demands are met. Others, as market gardening, can hold their own and make some increase as population increases. Still others, as tobacco growing, onion growing, and cranberry growing, are subject to limitation of soil, disease and

pest rather than to total market requirements and can make substantial growth if these limitations are met.

The year has shown that organizations of farmers on commodity lines can do a great deal to assist in securing adoption of sound practices. We have therefore capitalized such organizations in every possible way, and have endeavored to strengthen their usefulness as much as possible.

Home economics work has developed on a more sound and fundamental basis than ever before, with stress on leader-training. Subject matter is in a better state of development. County home demonstration agents have become heartily convinced of the value of group leader-training. Women have done more effective work as group leaders than ever before.

Work of boys and girls clubs in agriculture and home economics has included more older boys and girls. Numbers show some increase, but numbers are less an index of value than are nature and quality of work done. These have improved.

County budgets have been remarkably sustained in view of the present wave of economy. County staffs have shown but little change.

On the discouraging side of the scale is the ever-increasing difficulty of getting the necessary things done without spending a very considerable part of the time in overcoming objections and obstacles. Entire projects have been imperilled, with the prospect of losing the fruits of years of foundation work, because of failure to allow the means of continuance, even though the funds are in hand. Our nutrition project, commenced in 1913, is at present writing still under discussion in the State House, and months have lapsed during which the county home demonstration agents have no subject-matter leadership. The results of years of work in farm accounting are similarly threatened by failure to allow the publication of necessary account books except under wholly impractical conditions. Our printing program is months behind requirements, owing to difficulties of various sorts. Approval cannot be had of publications for which we are convinced that there is a need; and we are therefore obliged to spend more money than the publication itself would cost in answering questions by mimeograph material or personal correspondence. Failure to receive bills from Wright & Potter between March 1 and November 26 made it impossible for us to have any accurate idea of our commitments. Extreme delays in approval of manuscript give the impression of desire to reduce printing by causing discouragement, and to save money by delaying until the need is over, or by passing the matter into the next year's budget. Our staff do not have heart to write under these handicaps. Refusal in important cases of permission to travel out of state is a still further and most serious discouragement to our people. Our people have worked long hours overtime under conditions of personal discomfort and even of personal cost in order to accomplish their work. When they find themselves further handicapped and penalized by seemingly needless obstructions they are first grieved, then puzzled, and finally ask in disgust "What's the use?" Our standards will be lowered, and the record of our work diminished, if we even approximate the time-serving attitude which comes when the day is standardized, and when it is the habit to leave at closing time regardless of whether work is completed, or not.

During the year three vacancies have occurred by resignation. Mr. A. F. MacDougall resigned as Extension Professor of Farm Management to take up the management of the Middlesex County Extension Service. Mr. Louis M. Lyons resigned as extension editor to become city editor of the Springfield Republican. Lucy M. Queal resigned as nutrition specialist to pursue graduate work in Columbia University.

A full report of the year's work will be ready about January 1, 1924, when statistics are completed.

JOHN D. WILLARD,
Director.

TABLE I. — *New Appointments.**A. In the Academic Departments.*

- Assistant Professor of Beekeeping: Morton H. Cassidy, B.Sc., Massachusetts Agricultural College, 1920.
 Instructor in Pomology: Arthur P. French, B.Sc. Ohio State University, 1921; M.Sc., Massachusetts Agricultural College, 1923.
 Professor of Agricultural Education: Harry N. Glick, A.B. Bridgewater College, 1913; A.M., Northwestern University, 1914.
 Instructor in Physical Education: Howard R. Gordon, B.Sc., Massachusetts Agricultural College, 1923.
 Assistant Professor of Floriculture: Richard T. Muller, B.Sc., Cornell, 1916 M.Sc., Univ. of Maine, 1920.
 Instructor in Poultry Husbandry: Marion C. Pulley, B.Sc., Massachusetts Agricultural College, 1919.
 Instructor in Pomology: George J. Raleigh, B.Sc., Kansas State College, 1922; M.Sc., University of Nebraska.
 Instructor in Farm Law: Harold W. Smart, LL.B. Boston University, 1918.
 Instructor in Agricultural Economics: Hubert W. Yount, B.Sc. Ohio State University, 1921; M.Sc., Massachusetts Agricultural College, 1923.

B. In the Experiment Station.

- Investigator in Pomology: John S. Bailey, B.Sc., Michigan Agricultural College, 1922; M.Sc., Iowa State College, 1923.
 Assistant Research Professor of Botany: William L. Doran, B.Sc., Massachusetts Agricultural College, 1915; M.Sc., 1917.
 Assistant Research Professor of Agronomy: John P. Jones, B.Sc., University of Maryland, 1918; M.Sc., University of Maryland, 1921.
 Investigator in Agriculture: Donald S. Lacroix, B.Sc., Massachusetts Agricultural College, 1922.
 Laboratory Assistant: Gustaf E. R. Lindskog, B.Sc., Massachusetts Agricultural College, 1923.
 Assistant Research Professor of Vegetable Gardening: Victor A. Tiedjens, B.Sc., University of Wisconsin, 1921; M.Sc., 1922.
 Laboratory Assistant in Pomology: Harold E. Wilson.

C. In the Control Service.

- Analyst Control Service: Sylvester J. Broderick, B.Sc., New Hampshire State College, 1922.
 Laboratory Assistant in Poultry Disease Elimination: Hazel M. Parker.

D. In the Extension Service.

- Extension Assistant Professor of Pomology: Frederick E. Cole, Jr., B.Sc., Massachusetts Agricultural College, 1920.

E. Miscellaneous.

- Resident Nurse: Avis P. Christopher
 Matron, Infirmary: Mrs. Florence Thomas

TABLE II. — *Speakers for the Year.**A. Speakers at Assembly for the Year ending Nov. 30, 1923.***1922**

- Dec. 7. President L. H. Murlin, Boston
 Dec. 14. Dr. Edward H. Hume, China

1923

- Jan. 3. Mr. Ralph W. Redman, M. A. C.
 Jan. 10. Mr. Norman Thomas, New York City
 Jan. 17. Mr. Walter R. Clarke, Milton, N. Y.
 Jan. 24. Dr. J. E. Williams, New York City
 Jan. 31. President Mary E. Woolley, South Hadley

- Feb. 7. Mr. Arne Kildal, Washington, D. C.
- Feb. 14. Student Forum
- Feb. 21. Dr. J. S. Ferguson, New York City
- Feb. 28. Capt. George A. Parker, Boston
- Mar. 7. Freshmen — Sophomore Debate
- Mar. 14. Rev. J. Franklin Knotts, Northampton
- Mar. 28. Mr. Malcolm W. Davis, New York City
- Apr. 4. Dean Edward M. Lewis, M. A. C.
- Apr. 11. Dr. C. D. Woods, Boston
- Apr. 18. Hon. John M. Gibbs, Waltham
- Apr. 25. Student Forum
- May 2. Burnham Declamation Contest
- May 16. Dr. Robert O. Blood, Concord, N. H.
- May 23. Prof. William L. Machmer, M. A. C.
- Sept. 26. President Kenyon L. Butterfield
- Oct. 11. Prof. Frank A. Waugh, M. A. C.
- Oct. 18. Dr. William E. Barton, Chicago, Ill.
- Oct. 25. Judge Michael H. Sullivan, Boston
- Nov. 1. Mr. George H. Campbell, Baltimore, Md.
- Nov. 8. Student Forum
- Nov. 15. Mrs. Lucia Ames Mead, Boston
- Nov. 22. Mr. Samuel G. Inman, New York City

B. Speakers at Sunday Chapel for Year ending Nov. 30, 1923.

1922

- Dec. 10. Rev. John Haynes Holmes, New York City
- Dec. 17. Bishop Logan A. Roots, Hankow, China

1923

- Jan. 7. Bishop Edwin H. Hughes, Malden
- Jan. 14. Dean Charles R. Brown, New Haven, Conn.
- Jan. 21. Rev. Vaughan Dabney, Dorchester
- Jan. 28. Mr. Alfred E. Stearns, Andover
- Feb. 4. Rev. Moses R. Lovell, Durham, N. H.
- Feb. 11. Rev. Robert W. Coe, Norwood
- Feb. 18. Dean James A. Beebe, Boston
- Feb. 25. Dr. Frank W. Sheldon, Boston
- Mar. 4. Dr. W. E. Gilroy, Boston
- Mar. 11. Judge Michael J. Murray, Boston
- Mar. 18. Dr. Nehemiah Boynton, New York City
- Apr. 1. Rev. John B. Hanna, M. A. C.
- Apr. 8. Rev. Edwin B. Robinson, Holyoke
- Apr. 15. Rev. Kenneth C. MacArthur, Cambridge
- Apr. 22. Rev. James G. Gilkey, Springfield
- Apr. 29. Hon. P. Whitwell Wilson, New York City and London
- Sept. 30. President Kenyon L. Butterfield
- Nov. 4. Bishop Francis J. McConnell, Pittsburgh, Penn.
- Nov. 11. Dr. Albert Parker Fitch, New York City
- Nov. 18. Rev. John A. Ryan, D.D., Washington, D. C.
- Nov. 25. Rev. James G. Gilkey, Springfield

TABLE III. — Attendance.

	REGISTRATION NOV. 1, 1922.			REGISTRATION NOV. 1, 1923.		
	Men.	Women.	Total.	Men.	Women.	Total.
<i>A. In Work of College Grade.</i>						
Graduate Students	48	6	54	58	5	63
Senior Class	84	7	91	87	7	94
Junior Class	89	6	95	71	4	75
Sophomore Class	91	6	97	120	17	137
Freshman Class	167	20	187	112	13	125
Special Students	9	4	13	10	7	17
Totals	488	49	537	458	53	511
<i>B. Short Course Enrollment.</i>						
Two-Year Course, second year	116	5	121	84	5	89
Two-Year Course, first year	128	8	136	68	12	80
Vocational Poultry Course	8	1	9	4	—	4
Totals	252	14	266	156	17	173
<i>C. Other Short Course Enrollment.</i>						
School for Country Clergymen	31	2	33	32	2	34
Winter School	77	20	97	68	16	84
Summer School	23	147	170	17	110	127
School of Rural Home Life	—	16	16	—	—	—
School for Florists	—	—	—	7	4	11
Totals	131	185	316	156	132	288
<i>D. Convention Registration.</i>						
				1922.		1923.
Polish farmers' day				125		100
Farmers' week and annual poultry convention				2,000		2,500
Junior boys' and girls' prize winners' camp				100		75
One-day campers (boys and girls)				70		—
Extension workers conference				80		80
Sheep breeders' conference				100		75
Tri-State Conference on Fruit Growing				150		100
Middlesex County Club Champions				—		200
Hampden County Club Members				—		200
Totals				2,625		3,330

TABLE IV. — Legislative Budget, 1923.

ITEMS.	Requested, 1923.	Appropriated.
Chemistry laboratory and equipment	\$150,000	\$150,000
Improvements at power plant	39,250	—
Improvements at Tillson Farm	5,000	5,000
Laboratory, horticultural manufactures	38,000	—
Development of market garden field station, Waltham	25,000	—
Women's gymnasium	15,000	—
Addition to rural engineering shops and equipment	15,000	—
Roads	8,000	8,000
Tool sheds and garage, Division of Horticulture	6,000	6,000
Live Stock Replacement	5,000	5,000
Calf Barn	5,000	—
Superintendent's cottage, Tillson Farm	5,000	—
Fencing fruit plantations	3,000	—
New Walks	2,500	2,500
Grading and draining addition to athletic field	2,500	—
Land for cranberry station, East Wareham	1,000	—
Farm house to replace fire loss	—	8,000
Totals	\$325,250	\$184,500

TABLE V. — *Current Account, State Funds.*

	Requested 1923.	Appropriated 1923.	Deficiency Appropriation.	Expended 1923.	Balance.
Personal Services:					
Administration	\$37,850	\$37,600	—	\$36,910 97	\$689 03
Instruction	198,680	192,000	—	191,012 12	987 88
General Maintenance	122,500	118,000	\$49 30	119,451 58	—1,402 28
Experiment Station	72,420	66,750	13 10	62,777 87	3,985 23
Extension Service	52,180	50,000	—	50,098 03	—98 03
Market Garden Field Station	6,000	6,000	—	5,480 94	1,519 06
Market Garden Field Station spl.	—	1,000	—	—	—
Short Courses	53,227	52,600	—	50,763 47	1,836 53
Travel, Office and other exp.	48,695	42,500	852 85	42,898 58	454 27
Teaching, lab. sup. and equip.	55,000	55,000	2,503 62	58,230 93	—727 31
Experiment Station sup. equip. and publications.	16,000	14,000	259 31	16,572 04	—2,312 73
Experiment Station travel and office expenses	4,000	4,000	46 48	3,830 04	216 44
Extension Service supplies, equipment, travel, etc.	40,000	35,000	146 11	29,920 83	5,225 28
Short Courses	12,000	12,000	77 69	11,144 02	933 67
Heat, Light and Power.	72,000	72,000	583 48	87,464 27	5,119 21
Heat, Light and Power special; Farm and Grounds.	20,000	20,000	315 43	21,090 86	—775 43
Repairs, Ordinary	25,000	25,000	234 60	33,488 27	—8,253 67
Replacements	40,000	37,500	1,330 75	38,866 66	—35 91
Market Garden Field Station	4,000	3,200	139 08	3,780 12	—441 04
Fertilizer Law Control	14,500	13,500	9 17	13,325 10	184 07
Poultry Disease Law	7,000	7,500	16 95	7,621 10	—104 15
Milk Testing Inspection Law	600	600	—	544 15	55 85
Trustees' Expenses.	1,200	1,200	169 17	1,404 61	—35 44
Printing Reports	2,000	2,000	—	1,744 94	255 06
Commercial Feedstuffs	9,000	9,000	—	8,459 64	540 36
	\$913,852	\$897,950	\$6,747 09	\$896,881 14	\$7,815 85

TABLE VI. — *Statistics of Freshmen entering Massachusetts Agricultural College September 1923.*A. *Home Addresses of Students (classified by Towns and Cities).*

Abington	2	Greenfield	2	QUINCY	1
Acton	1	Hadley	3	Rockland	1
Amesbury	1	Hatfield	1	Russia	1
Amherst	9	Hingham	1	Sharon	1
Arlington	1	HOLYOKE	7	Sherborn	1
Ashby	1	Hubbardston	1	Southbridge	1
Barnstable	1	Hudson	1	Southwick	1
Becket	1	Leverett	1	SPRINGFIELD	5
Belmont	1	Lexington	1	Stoneham	2
BEVERLY	1	MALDEN	3	Stoughton	1
Billerica	1	Manchester	1	Sutton	1
Boston	7	MARLBOROUGH	1	Templeton	1
Brookfield	1	MEDFORD	2	Tisbury	1
CAMBRIDGE	1	Medway	1	Wakefield	1
Canaan, Conn.	1	MINNEAPOLIS, Minn.	1	WALTHAM	2
Charlton	1	Montague	2	Westborough	1
CHELSEA	1	Natick	3	West Bridgewater	1
Clinton	1	NEW BEDFORD	1	WESTFIELD	1
Deerfield	1	NEW LONDON, Conn	1	West Springfield	2
Dracut	1	NEWTON	1	West Stockbridge	1
Duxbury	1	NORTH ADAMS	1	Wilbraham	1
East Bridgewater	1	NORTHAMPTON	1	Williamsburg	2
Easthampton	2	Northbridge	1	Wilmington	2
Easton	1	North Brookfield	1	Winchester	1
Enfield	1	Northfield	2	WOBUEN	1
EVERETT	1	PITTSFIELD	2	WORCESTER	1
Fair Haven, Vt.	1	Plymouth	1	Wrentham	1
FALL RIVER	1	PORTLAND, Maine	1		

B. *Home Addresses (classified by States and Countries).*

	Number.	Per Cent		Number.	Per Cent.
Connecticut	2	1.60	Russia	1	.80
Maine	1	.80	Vermont	1	.80
Massachusetts	119	95.20			
Minnesota	1	.80		125	100.00

C. Home Addresses (classified by Counties of Massachusetts).

	Number.	Per Cent.		Number.	Per Cent.
Barnstable	1	.84	Middlesex	30	25.21
Berkshire	5	4.20	Norfolk	5	4.20
Bristol	3	2.52	Plymouth	8	6.72
Dukes	1	.84	Suffolk	8	6.72
Essex	3	2.52	Worcester	11	9.24
Franklin	8	6.72			
Hampden	17	14.27		119	99.97
Hampshire	19	15.97			

D. Nativity of Parents.

	Number.	Per Cent.
Neither parent foreign born	78	62.40
Both parents foreign born	27	21.60
Father (only) foreign born	10	8.00
Mother (only) foreign born	10	8.00
	125	100.00

E. Education of Father.

	Number.	Per Cent.
Common school	55	44.00
High School	36	28.80
Business School	6	4.80
College or University	22	17.60
No statistics	6	4.80
	125	100.00

F. Religious Census.

	MEMBERSHIP.		PREFERENCE.		TOTALS.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Baptist	8	6.4	1	.8	9	7.2
Catholic	24	19.2	—	—	24	19.2
Congregationalist	31	24.8	13	10.4	44	35.2
Episcopal	5	4.0	—	—	5	4.0
Methodist	10	8.0	4	3.2	14	11.2
Presbyterian	1	.8	—	—	1	.8
Unitarian	9	7.2	4	3.2	13	10.4
Universalist	—	—	2	1.6	2	1.6
Miscellaneous	8	6.4	3	2.4	11	8.8
No statistics	—	—	2	1.6	2	1.6
	96	76.8	29	23.2	125	100.0

G. Occupation of Father.

	Number.	Per Cent.
Agriculture and horticulture	34	27.20
Artisans	38	30.40
Business	18	14.40
Deceased or no statistics	9	7.20
Miscellaneous	16	12.80
Professional	10	8.00
	125	100.00

H. Intended Vocation of Student.

Agriculture or horticulture (practical)	41	32.80
Agriculture or horticulture (professional)	40	32.00
Professions	14	11.20
Miscellaneous	18	14.40
Undecided or no statistics	12	9.60
	125	100.00

I. Farm Experience.

Brought up on a farm	41	32.80
Not brought up on a farm and having no or practically no farm experience	32	25.60
Not brought up on a farm, but having had some farm experience	52	41.60
	125	100.00

J. Miscellaneous Statistics.

Average Age (years)	18.90
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REPORT OF THE TREASURER**For the Fiscal Year ending Nov. 30, 1923.****BALANCE SHEET.**

	DR.	CR.
1922		
Dec. 1. To balance on hand	\$37,379 40	
1923		
Nov. 30. To departmental income	151,288 70	
Nov. 30. To receipts from State Treasurer	950,582 97	
Nov. 30. To refunds to State Treasurer	196 41	
Nov. 30. To receipts from United States Treasurer	111,719 54	
Nov. 30. To November and October schedule in transit	113,316 40	
Nov. 30. Refunds transferred to State Treasurer		\$196 41
Nov. 30. Expenditures for fiscal year		1,175,602 23
Nov. 30. Income transferred to State Treasurer		151,288 70
Nov. 30. Balance on hand		37,396 08
	\$1,364,483 42	\$1,364,483 42

STATEMENT OF LEGISLATIVE APPORTIONMENT AND EXPENDITURES FOR FISCAL
YEAR ENDING NOVEMBER 30, 1923, AND APPORTIONMENT REQUESTED FOR
1924.

	Apportionment for Last Fiscal Year.		Expenditures.		Requested Appor- tionment for New Fiscal Year.	
College:						
Personal services	\$347,649 30		\$347,374 67		\$370,704 00	
Maintenance	238,989 98		243,172 91		213,375 00	
		\$586,639 28		\$590,547 58		\$584,079 00
Experiment Station:						
Personal services	\$66,750 00		\$62,777 87		\$87,935 00	
Maintenance	18,305 79		20,402 08		22,050 00	
		85,055 79		83,179 95		109,985 00
Extension Service:						
Personal services	\$50,013 10		\$50,098 03		\$55,788 00	
Maintenance	35,146 11		29,920 83		40,400 00	
		85,159 21		80,018 86		96,188 00
Short Courses:						
Personal services	\$52,600 00		\$50,763 47		\$60,357 00	
Maintenance	12,077 69		11,144 02		15,350 00	
		64,677 69		61,907 49		75,707 00
Market Garden Field Station:						
Personal services	\$7,000 00		\$5,480 94		\$6,000 00	
Maintenance	3,339 08		3,780 12		4,400 00	
		10,339 08		9,261 06		10,400 00
Trustees travel	\$1,369 17		\$1,404 61		\$1,200 00	
Printing reports	2,000 00		1,744 94		2,000 00	
Commercial feedstuffs . .	9,000 00		8,459 64		9,500 00	
Totals		12,369 17		11,609 19		12,700 00
Fertilizer law	\$13,509 17		\$13,325 10		\$13,500 00	
Poultry law	7,516 95		7,621 10		8,000 00	
Milk testing law	600 00		544 15		600 00	
Totals		21,626 12		21,490 35		22,100 00
Replacements.	\$38,830 75	38,830 75	\$38,866 66	38,866 66	\$27,500 00	27,500 00
Totals		\$904,697 09		\$896,881 14		\$938,659 00
Balance unexpended . . .		-		7,815 95		-
		-		\$904,697 09		-

CASH STATEMENT.

	Other Funds.	State Funds.
Balance Dec. 1, 1922	\$37,379 40	-

Receipts.

College receipts from students and others:		
Tuition	-	\$5,197 57
Laboratory fees	-	6,849 19
Rents	-	11,855 88
Departmental sales:		
Produce	-	66,508 98
Miscellaneous	-	8,371 02
Experiment Station:		
Cranberry receipts	-	474 53
Chemical receipts	-	473 18
Miscellaneous	-	2,568 51
Extension Service:		
Correspondence Courses	-	1,261 75
Miscellaneous	-	142 71
Short Courses:		
Students' fees	-	4,887 14
Winter school	-	366 00
Miscellaneous	-	-
Market Garden Field Station:		
Produce	-	3,363 57
Feed Law	-	19,726 00
Fertilizer Law	-	14,504 18
Milk Testing Law	-	779 85
Poultry Disease Law	-	3,958 64

		Other Funds.	State Funds.
Treasurer of the Commonwealth:			
Maintenance		—	\$802,887 68
Special appropriations		—	142,431 97
Endowment.		\$3,313 32	—
Department of Education.		1,950 00	—
Federal Government:			
Land Grant of 1862		7,300 00	—
Hatch Fund of 1887		15,000 00	—
Morrill Fund of 1890.		16,666 67	—
Adams Fund of 1906		15,000 00	—
Nelson Fund of 1907		16,666 66	—
Smith Lever Fund of 1914		31,234 76	—
Short Course, Federal Project		9,650 00	—
Short Course, Two Years		201 45	—
November and October schedules in transit		—	113,316 40
		\$154,362 26	\$1,209,924 75
<i>Payments.</i>			
College expenses:			
Personal services.		\$45,896 65	\$347,374 67
Maintenance		—	243,172 91
Experiment Station:			
Personal services.		27,330 00	62,777 87
Maintenance		2,389 00	20,402 08
Extension service:			
Personal services.		26,893 45	50,098 03
Maintenance		2,558 72	29,920 83
Short Courses:			
Personal services.		7,538 23	50,763 47
Maintenance		4,360 13	11,144 02
Market Garden Field Station:			
Personal services.		—	5,480 94
Maintenance		—	3,780 12
Trustees travel		—	1,404 61
Printing reports		—	1,744 94
Replacements		—	38,866 66
Commercial feedstuffs		—	8,459 64
Fertilizer law		—	13,325 10
Milk testing law		—	544 15
Poultry disease law.		—	7,621 10
Special appropriations:			
1922 Chemistry Laboratory		—	128,554 94
1922 Power Plant Improvements		—	4,395 29
1922 Tillson Farm Improvements		—	181 35
1923 Tenement House		—	2,243 57
1923 Tillson Farm Improvements		—	4,170 55
1923 Tool shed and Garage		—	5,024 42
1923 New Walks.		—	2,239 94
1923 Road Improvements.		—	7,991 61
1923 Livestock		—	2,067 28
1915 Microbiology Building		—	4,885 96
Income		—	151,288 70
Balance		37,396 08	—
		\$154,362 26	\$1,209,924 75

CURRENT ACCOUNTS, 1923.

Disbursements and Receipts.

ACCOUNTS.	Disbursements from Nov. 30, 1922, to Nov. 30, 1923.	Receipts from Nov. 30, 1922, to Nov. 30, 1923.	Apportionment for Year ending Nov. 30, 1923.	Balance to Credit.
Dean's Office	\$767 66	—	\$701 73	—\$65 93
Executive Order	10,242 36	\$0 63	12,150 15	1,907 79
President's Office	1,959 60	3 76	2,032 47	42 87
Registrar's Office	631 08	—	850 74	219 66
Salaries	36,910 97	—	37,600 00	689 03
Treasurer's Office	1,372 29	85 93	1,702 66	330 37
Maintenance, Academic:				
Agricultural Economics	434 85	—	551 00	116 15
Agricultural Education	209 79	—	407 93	198 14
Agronomy	1,173 23	329 00	1,200 72	27 49
Animal Husbandry	557 57	117 50	602 74	45 17
Beekeeping	319 25	—	350 00	30 75
Botany	1,577 58	746 00	1,605 60	28 02
Chemistry	7,236 32	1,654 00	7,328 97	92 65
Dairying	32,787 65	24,991 24	32,185 05	—602 60
Domestic Science	1,531 59	119 50	1,434 06	—97 53
Economics and Sociology	75 83	—	150 73	74 90
Entomology	1,217 75	137 00	1,304 00	86 25
Farm Management	402 01	62 50	507 45	105 44
Floriculture	7,343 36	2,777 43	7,511 62	168 26
Forestry	272 26	—	351 15	78 89
General Agriculture	2,419 15	—	2,500 00	80 85
Horticultural Mfgs.	3,328 38	564 27	3,533 99	205 61
Hospital	4,383 29	845 05	3,361 24	—1,022 05
Landscape Gardening	344 72	361 84	502 55	157 83
Language and Literature	292 10	163 00	300 00	7 90
Mathematics	345 75	47 00	400 15	54 40
Microbiology	1,988 76	451 85	2,405 34	416 58
Military Science	1,673 64	33 50	1,700 95	27 31
Mount Toby	3,479 64	8 25	3,505 35	25 71
Physical Education	1,621 30	767 80	1,350 00	—271 30
Physics	719 21	66 00	776 53	57 32
Pomology	5,497 17	2,694 11	5,506 61	9 44
Poultry Husbandry	16,712 90	19,416 31	14,544 92	—2,167 98
Rural Engineering	888 44	105 50	900 25	11 81
Rural Sociology	113 12	—	201 75	88 63
Vegetable Gardening	6,634 72	2,333 99	6,501 12	—133 60
Veterinary Science	2,399 44	100 00	2,361 30	—38 14
Women's Dormitory	3,019 34	—	2,710 62	—308 72
Zoology and Geology	473 79	110 00	650 25	176 43
Maintenance, General:				
Farm	16,778 87	1,233 02	13,560 93	—3,217 94
General Horticulture	9,250 44	157 66	9,018 73	—231 71
Graduate School	82 44	—	200 00	117 56
Grounds	8,370 38	—	9,500 00	1,129 62
Library	7,113 20	96 56	8,096 08	982 88
Livestock	28,361 93	14,359 88	23,754 50	—4,607 43
General Expense	648 80	1,496 69	—	—
Operating and Maintenance	165,541 54	22,345 87	165,895 13	353 59
Replacements	38,866 66	—	38,830 75	—35 91
Endowment Fund	10,613 32	10,613 32	10,613 32	3,650 00
Instruction:				
Salaries	191,012 12	—	192,000 00	987 88
U. S. Treasurer, Morrill Fund	16,666 67	16,666 67	16,666 67	9,722 22
U. S. Treasurer, Nelson Fund	16,666 66	16,666 66	16,666 66	9,722 21
State Treasurer, Account of schedules	—	629,414 24	—	—
Income to State Treasurer	98,782 64	—	—	—
Balance beginning fiscal year, Dec. 1, 1922	\$772,143 53	\$772,143 53	\$669,044 46	\$19,426 80
Balance on hand Nov. 30, 1923	23,094 43	—	—	—
	\$795,237 96	\$795,237 96	—	—

COLLEGE ACCOUNTS.

Summary.

	Disburse- ments.	Receipts.
Cash on hand Dec. 1, 1922	-	\$23,094 43
Institution receipts Nov. 30, 1923	-	98,782 64
State Treasurer's receipts Nov. 30, 1923	-	629,414 24
United States Treasurer's receipts Nov. 30, 1923	-	33,333 33
State Treasurer, Department of Education	-	1,950 00
State Treasurer, Endowment fund	-	10,613 32
Total Disbursements	\$675,310 89	-
Receipts turned in to State Treasurer.	98,782 64	-
	\$774,093 53	\$797,187 96
Bills receivable Dec. 1, 1922 deducted	-	14,219 25
Bills payable Dec. 1, 1922, deducted	1,063 12	-
	\$773,030 41	\$782,968 71
Bills receivable Nov. 30, 1923	-	11,029 42
Bills payable Nov. 30, 1923	1,961 24	-
Balance	19,006 48	-
	\$793,998 13	\$793,998 13

NET COSTS OF THE DEPARTMENTS.

DEPARTMENT.	Salaries.	Labor.	Maintenance.	Total.	Receipts.	Balance.
Dean's Office	\$5,125 00	\$382 75	\$384 91	\$5,892 66	—	\$5,892 66
Executive Order	1,155 00	1,037 50	9,204 86	11,397 36	\$0 63	11,396 73
President's Office	15,473 57	318 19	1,671 41	17,463 17	3 76	17,459 41
Registrar's Office	— ¹	95 57	535 51	631 08	—	631 08
Treasurer's Office	15,157 40	219 69	1,152 60	16,529 69	85 93	16,443 76
Totals	\$36,910 97	\$2,053 70	\$12,949 29	\$51,913 96	\$90 32	\$51,823 64
<i>Instruction and Maintenance.</i>						
Agricultural Economics	\$8,932 97	\$62 49	\$372 36	\$9,367 82	—	\$9,367 82
Agricultural Education	6,518 35	—	209 79	6,728 14	—	6,728 14
Agonomy	8,785 00	581 33	591 90	9,958 23	\$329 00	9,629 23
Animal Husbandry	5,560 00	79 77	477 80	6,117 57	117 50	6,000 07
Beekeeping	1,440 00	114 15	205 10	1,759 25	—	1,759 25
Botany	11,955 13	349 00	1,228 58	13,532 71	746 00	12,786 71
Chemistry	13,581 98	945 09	6,291 23	20,818 30	1,654 00	19,164 30
Dairying	7,215 00	6,272 05	26,515 60	40,002 65	24,991 24	15,011 41
Dean's Office	2,576 61	—	—	2,576 61	—	2,576 61
Domestic Science	6,954 43	227 00	1,304 59	8,486 02	119 50	8,366 52
Economics and Sociology	3,208 33	—	75 83	3,284 16	—	3,284 16
Entomology	10,707 00	735 70	482 05	11,924 75	137 00	11,787 75
Farm	—	24,049 94	21,090 86	45,140 80	15,592 90	29,547 90
Farm Management	5,500 01	84 20	317 81	5,902 02	62 50	5,839 52
Floriculture	2,865 00	6,056 27	1,287 09	10,208 36	2,777 43	7,430 93
Forestry	2,530 02	150 97	121 29	2,802 28	—	2,802 28
General Agriculture	3,846 53	1,820 29	598 86	6,265 68	—	6,265 68
General expense	—	1,955 17	Cr. 1,306 37	648 80	1,496 69	—847 89
General Horticulture	10,440 01	5,898 51	3,351 93	19,690 45	157 66	19,532 79
Graduate School	—	—	82 44	82 44	—	82 44
Grounds	—	7,335 30	1,035 08	8,370 38	—	8,370 38
Horticultural Manufactures	5,340 00	1,623 46	1,704 92	8,668 38	564 27	8,104 11
Hospital	—	2,430 92	1,952 37	4,383 29	845 05	3,538 24
Landscape Gardening	3,289 00	—	344 72	3,633 72	361 84	3,271 88

¹ Registrar's Office Salaries included in "Instruction and Maintenance."

NET COSTS OF THE DEPARTMENTS — *Concluded.*

<i>Instruction and Maintenance — Con.</i>	Salaries.	Labor.	Maintenance.	Total.	Receipts.	Balance.
Language and Literature. . . .	\$22,203 33	\$13 97	\$278 13	\$22,495 43	\$163 00	\$22,332 43
Library.	8,888 61	1,600 36	5,512 84	16,001 81	96 56	15,905 25
Mathematics	10,740 00	206 05	139 70	11,085 75	47 00	11,038 75
Microbiology	11,045 00	736 20	1,252 56	13,033 76	451 85	12,581 91
Military	600 00	280 28	1,393 36	2,273 64	33 50	2,240 14
Mount Toby	—	3,270 63	209 01	3,479 64	8 25	3,471 39
Operating and Maintenance	—	32,478 73	133,062 81	165,541 54	22,345 87	143,195 67
Physical Education	10,270 00	755 63	865 67	11,891 30	767 80	11,123 50
Physics	8,370 00	186 53	532 68	9,089 21	66 00	9,023 21
Pomology	6,430 01	4,407 72	1,089 45	11,927 18	2,694 11	9,233 07
Poultry Husbandry	9,285 00	3,535 04	13,177 86	25,997 90	19,416 31	6,581 59
Registrar's Office	2,160 00	—	—	2,160 00	—	2,160 00
Rural Engineering	5,900 00	378 84	509 60	6,788 44	105 50	6,682 94
Rural Sociology	4,790 00	—	113 12	4,903 12	—	4,903 12
Replacements	—	—	38,866 66	38,866 66	—	38,866 66
Vegetable Gardening	2,445 00	5,080 31	1,554 41	9,079 72	2,333 99	6,745 73
Veterinary.	5,476 45	1,350 86	1,048 58	7,875 89	100 00	7,775 89
Women's Dormitory	—	2,274 74	744 60	3,019 34	—	3,019 34
Zoölogy and Geology	5,110 00	70 38	403 41	5,583 79	110 00	5,473 79
Totals.	\$234,958 77	\$117,397 88	\$269,090 28	\$621,446 93	\$98,692 32	\$522,754 61
Grand Totals	\$271,869 74	\$119,451 58	\$282,039 57	\$673,360 89	\$98,782 64	\$574,578 25

\$10,613 32 Land Grant and Endow.

33,333 33 Morrill & Nelson

191,012 12 Instruction

36,910 97 Administration

 \$271,869 74

1,950 00 Dept. of Education

 \$273,819 74

College Expenses as per Cash Statement:

\$636,444 23

38,866 66

 \$675,310 89

Total of this Statement:

\$673,360 89

1,950 00 Dept. of Education

 \$675,310 89

FARM DISBURSEMENTS.

	Repairs.	Labor.	Equip- ment.	Feed.	Supplies.	Sundry.	Bedding.	Per- tilizer.	Seeds.	Impts.	Totals.
Dairy Cattle	-	\$6,115 73	\$339 90	\$197 56	\$1,841 20	\$1,468 60	-	-	-	-	\$9,982 99
Horses	-	1,649 67	5 67	-	19 44	119 34	-	-	-	-	1,794 12
Sheep	-	1,210 31	29 60	-	49 42	25 78	-	-	-	-	1,315 11
Swine	-	1,258 50	-	312 40	5 88	50 01	-	-	-	-	1,626 79
Supplies	-	609 48	-	10,870 98	-	-	\$2,182 46	-	-	-	13,662 92
Teams	-	- 20 97	314 42	-	-	217 50	-	-	-	-	510 95
Field crops	-	6,356 41	-	-	4 44	21 00	-	\$480 59	\$262 25	-	7,124 69
Tools & Mach.	\$708 15	631 51	205 13	-	552 07	-	-	-	-	-	2,096 86
Miscellaneous	-	6,239 30	-	-	86 17	277 44	-	-	-	\$443 46	7,046 37
Totals	\$708 15	\$24,049 94	\$894 72	\$11,380 94	\$2,558 62	\$2,179 67	\$2,182 46	\$480 59	\$262 25	\$443 46	\$45,140 80

FARM CREDITS.

	Wool.	Milk.	Stock.	Sundry.	Labor.	Field Crops.	Tools and Machinery.	Improve- ments.	Totals.
Dairy Cattle	-	\$7,697 71	\$3,997 22	\$32 06	-	-	-	-	\$11,726 99
Horses	-	-	30 00	-	-	-	-	-	30 00
Sheep	-	-	1,297 51	-	-	-	-	-	1,297 51
Swine	-	-	1,305 38	-	-	-	-	-	1,305 38
Supplies	-	-	-	-	-	-	-	-	-
Teams	-	-	-	-	\$108 00	-	-	-	108 00
Field Crops	-	-	-	-	-	\$124 10	-	-	124 10
Tools & Machinery	-	-	-	-	-	-	\$28 00	-	28 00
Miscellaneous	-	-	-	-	168 60	-	-	\$804 32	972 92
Totals	-	\$7,697 71	\$6,630 11	\$32 06	\$276 60	\$124 10	\$28 00	\$804 32	\$15,592 90

AGRICULTURAL DIVISION.

Disbursements and Receipts.

	Disbursements.	Receipts.
Agronomy	\$1,173 23	\$329 00
Animal husbandry	557 57	117 50
Dairying	32,787 65	24,991 24
Farm	35,408 30	15,332 80
Farm management	402 01	62 50
Poultry husbandry	16,712 90	19,416 31
Rural engineering	888 44	105 50
Division totals.	\$87,930 10	\$60,354 85

Summary.

	DR.	CR.
By total division receipts		\$60,354 85
By bills receivable		9,769 94
By net apportionment		26,901 71
To total division disbursements	\$87,930 10	
To bills payable	624 71	
Balance	8,471 69	
	\$97,026 50	\$97,026 50

Inventory of Quick Assets.

	Nov. 30, 1922.	Nov. 30, 1923.
Inventory of produce	\$13,038 91	\$16,370 55
Inventory of cattle	19,510 00	22,855 00
Inventory of swine	1,487 00	1,481 00
Inventory of horses	3,800 00	3,775 00
Inventory of poultry	4,243 75	4,783 50
Inventory of sheep	1,805 00	2,020 00
	\$43,884 66	\$51,284 55

HORTICULTURAL DIVISION.

Disbursements and Receipts.

	Disbursements.	Receipts.
Floriculture	\$7,343 36	\$2,777 43
Forestry	272 26	-
General horticulture	9,250 44	157 66
Grounds	8,370 38	-
Horticultural manufactures	3,328 38	564 27
Landscape gardening	344 72	361 84
Mount Toby	3,479 64	8 25
Pomology	5,497 17	2,694 11
Vegetable gardening	6,634 72	2,333 99
Division totals.	\$44,521 07	\$8,897 55

Summary.

	DR.	CR.
By total division receipts		\$8,897 55
By bills receivable		1,087 98
By net apportionment		37,033 57
To total division disbursements	\$44,521 07	
To bills payable	136 96	
By balance	2,361 07	
	\$47,019 10	\$47,019 10

Inventory of Quick Assets.

	Nov. 30, 1922.	Nov. 30, 1923.
Floriculture	\$1,800 00	\$2,700 00
General horticulture (live stock)	1,385 00	1,140 00
Horticultural manufactures	420 00	295 00
Mount Toby	98 75	78 40
Pomology	1,300 00	575 00
Vegetable gardening	75 00	547 00
	\$5,078 75	\$5,335 40

EXPERIMENT STATION.*Disbursements and Receipts.*

	Disbursements from Dec. 1, 1922, to Nov. 30, 1923.	Receipts from Dec. 1, 1922, to Nov. 30, 1923.	Apportion- ment for year ending Nov. 30, 1923.	Balance to Credit.
Administration	\$1,553 67	—	\$1,643 15	\$89 48
Agricultural	10,946 73	\$306 99	10,975 00	28 27
Agricultural economics	803 02	—	1,050 00	246 98
Animal husbandry	100 91	—	—	—100 91
Asparagus	—	—	140 00	140 00
Botanical	2,982 67	—	2,808 25	—174 42
Chemical	2,868 02	473 18	4,109 52	1,241 50
Cranberry	3,501 14	474 53	4,030 20	529 06
Entomological	663 95	—	1,102 90	438 95
Farm management	192 00	—	200 00	8 00
Freight and Express	442 40	—	400 00	—42 40
Library	891 39	—	1,034 29	142 90
Meteorology	468 93	—	600 00	131 07
Microbiology	916 69	—	1,003 46	86 77
Pomology	3,242 38	2,261 52	3,046 06	—196 32
Poultry	4,323 65	—	3,624 57	—699 08
Publications	1,234 87	—	2,011 39	776 52
Salaries	76,722 25	—	76,077 00	—645 25
Treasurer's office	309 26	—	400 00	90 74
Veterinary	735 02	—	800 00	64 98
Hatch fund	—	15,000 00	—	—
Adams fund	—	15,000 00	—	—
State Treasurer, account of schedules	—	83,179 95	—	—
Income remitted to State Treasurer	3,516 22	—	—	—
	\$116,415 17	\$116,696 17	\$115,055 79	\$2,156 84
Balance beginning fiscal year Dec. 1, 1922	—	3,994 00	—	—
Balance on hand Nov. 30, 1923	4,275 00	—	—	—
	\$120,690 17	\$120,690 17	—	—

Summary.

	Disburse- ments.	Receipts.
Cash on hand Dec. 1, 1922	—	\$3,994 00
Receipts from State Treasurer	—	83,179 95
Receipts from United States Treasurer	—	30,000 00
Receipts from other sources	—	3,516 22
Total Disbursements	\$112,898 95	—
Receipts turned in to State Treasurer	3,516 22	—
	\$116,415 17	\$120,690 17
Bills receivable Dec. 1, 1922 deducted	—	1,046 60
Bills payable Dec. 1, 1922 deducted	34 43	—
	\$116,380 74	\$119,643 57
Bills receivable Nov. 30, 1923	—	1,273 14
Bills payable Nov. 30, 1923	329 96	—
Balance	4,206 01	—
	\$120,916 71	\$120,916 71

EXTENSION SERVICE.
Disbursements and Receipts.

CLASSIFICATION.	Disbursements.	Receipts.	Apportionment.	Balance.
Administration	\$2,156 35	\$97 86	\$3,514 64	\$1,358 29
Animal husbandry	585 31	—	1,001 50	416 19
Clothing efficiency	2,168 86	—	1,207 60	—961 26
Co-op. Marketing	489 18	—	900 30	411 12
Correspondence Courses	2,827 50	1,261 75	2,100 60	—726 90
County Agents Work	987 73	—	1,210 06	222 33
Dairying	196 08	—	300 00	103 92
Exhibits	238 31	—	752 30	513 99
Extension Courses at College	1,868 13	—	1,500 00	—368 13
Extension schools	489 17	—	250 60	—238 57
Farm management demonstration	935 27	16 50	1,202 95	267 68
Forestry	21 10	—	200 00	178 90
Home economics	2,080 98	27 10	2,016 87	—64 11
Home gardening	537 76	—	500 00	—37 76
Horticultural manufactures	1,554 49	—	1,201 75	—352 74
Junior extension work	5,349 89	—	5,518 09	168 20
Landscape extension	217 61	—	826 05	608 44
Lectures	105 90	—	125 00	19 10
Library extension	152 43	—	241 50	89 07
Nutrition and household management	1,667 98	—	1,817 25	149 27
Plant diseases	11 02	—	—	—11 02
Pomology	1,237 78	—	1,501 65	263 87
Poultry husbandry	1,010 16	—	1,200 60	190 44
Printing	2,691 45	1 25	4,756 15	2,064 70
Personal services	50,098 03	—	50,013 10	—84 93
Rural engineering	14 04	—	400 00	385 96
Soils and crops	326 35	—	900 65	574 30
State Treasurer, account of schedules	—	80,018 86	—	—
Income to State Treasurer	1,404 46	—	—	—
	\$81,423 32	\$81,423 32	\$85,159 21	\$5,140 35

Summary.

	Disbursements.	Receipts.
Balance Dec. 1, 1922 ¹	—	\$7,303 82
Receipts Nov. 30, 1923	—	\$1,404 46
Received from State Treasurer	—	80,018 86
Received from United States Treasurer	—	31,234 76
Disbursements to Nov. 30, 1923 ¹	\$109,471 03	—
Receipts turned into State Treasurer	1,404 46	—
	\$110,875 49	\$119,961 90
Bills receivable Dec. 1, 1922 deducted	—	55 47
Bills payable Dec. 1, 1922 deducted	—	—
	\$110,875 49	\$119,906 43
Bills receivable Nov. 30, 1923	—	23 32
Bills payable Nov. 30, 1923	58 84	—
Balance	8,995 42	—
	\$119,929 75	\$119,929 75

¹ Includes Federal Smith Lever Fund.

	Disbursements.	Receipts.
Administration	\$207 91	—
Animal husbandry	111 66	—
Clothing efficiencies	86 98	—
Co-operative marketing	79 87	—
Dairying	13 79	—
District and county agents	77 25	—
Farm management demonstration	5 08	—
Forestry	22 24	—
Home economics	111 02	—
Home gardening	139 76	—
Horticultural manufactures	287 99	—
Junior extension works	914 60	—
Landscape gardening	47 36	—
Nutrition and household management	71 98	—
Pomology	123 82	—
Poultry husbandry	152 02	—
Salaries	26,893 45	—
Soils and crops	105 39	—
State Treasurer	—	\$31,234 76
	\$29,452 17	\$31,234 76
Balance beginning fiscal year December 1, 1922	—	7,303 82
Balance on hand November 30, 1923	9,086 41	—
Totals	\$38,538 58	\$38,538 58

SHORT COURSES.

	Disbursements.	Receipts.	Apportionment.	Balance.
Agricultural economics	\$14 97	—	\$100 00	\$85 03
Agronomy	477 00	\$318 00	501 25	24 25
Animal husbandry	97 79	96 00	100 00	2 21
Dairying	3,000 50	401 00	3,000 00	— 50
Domestic science	91 25	—	100 00	8 75
Entomology	85 20	—	50 00	— 35 20
Farm Management	11 28	—	50 00	38 72
Floriculture	89 01	58 50	100 00	10 99
Forestry	—	—	100 00	100 00
General horticulture	138 33	111 50	217 39	79 06
Horticulture manufactures	651 30	—	750 00	98 70
Library	43 14	—	150 00	106 86
Microbiology	49 54	35 00	50 00	46
Pomology	919 10	—	1,047 05	127 95
Poultry husbandry	480 25	459 00	600 00	119 75
Personal services	50,763 47	—	52,600 00	1,836 53
Rural Engineering	852 13	393 00	851 56	— 57
Short Course office	3,691 34	—	3,810 44	119 10
Treasurer's office	168 35	—	200 00	31 65
Tuition	—	2,937 14	—	—
Vegetable gardening	283 54	78 00	300 00	16 46
Winter school registration	—	366 00	—	—
Totals	\$61,907 49	\$5,253 14	\$64,677 69	\$2,770 20

Summary.

	DR.	CR.
State Appropriation		\$64,677 69
Amount of receipts		5,253 14
Amount of receipts transferred to State Treasurer	\$5,253 14	
Department expenditures	61,907 49	
Balance unexpended	2,770 20	
Totals	\$69,930 83	\$69,930 83

MARKET-GARDENING FIELD STATION.

	Debit.	Credit.
Labor	\$5,480 94	
Maintenance	3,780 12	
Totals	\$9,261 06	
State Appropriation		\$10,339 08
Amount of receipts		3,363 57
Amount of receipts transferred to State Treasurer	\$3,363 57	
Department expenditures	9,261 06	
Balance unexpended	1,078 02	
Totals	\$13,702 65	\$13,702 65

SPECIAL APPROPRIATIONS.

	Date made.	Appropriations.	Amount Expended to Date.	Unexpended Balance.
Chemistry Laboratory	1922	\$300,000 00	\$185,275 31	\$114,724 69
Power Plant Improvements	1922	63,000 00	63,000 00	-
Tillson Farm Improvements	1922	5,000 00	5,000 00	-
Tenement House	1923	8,000 00	2,243 57	5,756 43
Tillson Farm Improvements	1923	5,000 00	4,170 55	829 45
Tool Shed and Garage	1923	6,000 00	5,024 42	975 58
Walks	1923	2,500 00	2,239 94	260 06
Roads	1923	8,000 00	7,991 61	8 39
Live stock	1923	5,000 00	2,067 28	2,932 72
Microbiology Building	1915	4,887 61	4,885 96	1 65
Amount spent previous to Dec. 1, 1922	-	\$407,387 61	\$281,898 64	\$125,488 97
Amount expended during fiscal year	-	-	-	120,143 73
Unexpended balance Nov. 30, 1923	-	-	125,488 97	161,754 91
	-	\$407,387 61	\$407,387 61	\$407,387 61

INVENTORY — REAL ESTATE.

Land (Estimated Value).

Angus land	\$800 00
Allen place	500 00
Baker place	2,500 00
Bangs place	2,350 00
Brooks farm	11,000 00
Brown land	500 00
Charmbury place	450 00
Clark place	4,500 00
College farm	37,000 00
Cranberry land	12,745 00
George Cutler, Jr., Trustee	2,700 00
Dickinson land	7,850 00
Harlow farm and orchard	3,284 63
Hawley and Brown place	675 00
Kellogg place	3,368 45

P.D. 31.	
Loomis place	\$415 00
Louisa Baker place	5,000 00
Market Garden Field Station	4,800 00
Mount Toby demonstration forest	30,000 00
Newell farm	2,800 00
Old creamery place	1,000 00
Owen farm	5,000 00
Pelham quarry	500 00
Tillson farm	2,950 00
Westcott place	2,250 00

\$144,938 08

College Buildings (Estimated Value) 1923.

	Inventory at Beginning of Year.	Per Cent deducted.	Value at Beginning of Year less Deterioration.	Repairs and Improve- ments during Year.	Total Value at Close of Fiscal Year.
Adams Hall	\$127,604 51	2	\$125,052 42	\$757 48	\$125,809 90
Apiary	2,884 82	2	2,827 13	-	2,827 13
Cashier's House	1,675 99	5	1,592 19	553 64	2,145 83
Chemistry Store House	50 00	2	49 00	55	49 55
Clark Hall	61,066 59	2	59,845 26	360 43	60,205 69
Cold Storage Laboratory	10,375 39	2	10,168 32	4 30	10,172 62
Dairy barn and storage	30,162 98	3	29,258 09	103 40	29,361 49
Draper Hall	69,615 10	3	67,526 65	4,445 02	71,971 67
Drill Hall and Gun Shed	9,183 03	5	8,723 88	499 64	9,223 52
Durfee Glass House, old	7,298 59	5	6,933 66	362 63	7,296 29
Durfee Glass House, new	10,464 50	5	9,441 27	805 89	10,247 16
Farm blacksmith shop	431 06	3	418 13	-	418 13
Farm bungalow	2,509 37	3	2,434 09	43 55	2,477 64
Farm House No. 1	3,097 06	3	3,004 15	192 47	3,196 62
Farm Bull pens and Fence	3,377 50	5	3,208 62	1,320 78	4,529 40
Fernald Hall	70,781 06	2	69,365 44	616 65	69,982 09
Flint Laboratory	68,856 08	2	67,478 96	2,101 62	69,580 58
French Hall	45,476 95	2	44,567 41	1,129 36	45,696 77
Grinnell Arena	8,741 11	2	8,566 29	62 06	8,628 35
Grounds Tool Shed	199 55	5	189 57	-	189 57
Harlow House	1,956 56	5	1,858 73	231 56	2,090 29
Horse Barn	4,655 80	3	4,516 13	110 95	4,627 08
Head of Division of Horticulture	2,486 60	5	2,362 27	399 07	2,761 34
Horticultural barn	3,655 43	3	3,545 77	216 05	3,761 82
Horticultural Garage	-	-	-	1,533 48	1,533 48
Horticultural tool shed	1,567 39	3	1,520 37	2,773 69	4,294 06
Horticultural open shed	469 35	5	445 88	-	445 88
Horticultural Manufactures shed	3,443 56	5	3,271 38	-	3,271 38
Hospital	15,477 99	2	15,168 43	258 45	15,426 88
Jewett house and barn	3,106 31	5	2,950 99	205 04	3,156 03
Machinery barn	3,331 69	3	3,231 74	110 46	3,342 20
Market Garden Field Station barn	3,024 29	3	2,933 56	-	2,933 56
Market Garden Field Station Foreman's Cottage	4,107 03	3	3,983 82	-	3,983 82
Market Garden Field Station Greenhouse Plant	9,002 44	5	8,552 32	-	8,552 32
Market Garden Field Station Wagon shed	507 02	3	491 81	-	491 81
Market Garden Field Station Administration Building	8,730 00	3	8,468 10	-	8,468 10
Market Garden Field Station Boiler House	5,645 40	3	5,476 04	-	5,476 04
Mathematical Building	4,538 37	5	4,311 46	83 44	4,394 90
Memorial Hall	103,486 14	2	101,416 42	716 60	102,133 02
Microbiology Building	56,243 44	2	55,118 57	359 02	55,477 59
Military Storage	203 62	5	193 44	-	193 44
Mount Toby House and Barn	3,312 00	5	3,146 40	256 23	3,402 63
North Dormitory	27,219 47	2	26,675 08	878 27	27,553 35
Physics Laboratory	4,797 18	5	4,557 32	77 48	4,634 80
Piggery	2,395 35	3	2,323 49	12 48	2,335 97
Poultry departments:					
1. demonstration building	1,516 03	2	1,485 71	387 58	1,873 29
2. oil house	73 56	2	72 09	-	72 09
3. brooder, killing and fattening laboratory	2,315 10	2	2,268 80	-	2,268 80
4. mechanics, storage building and incubator cellar	3,969 67	2	3,890 28	259 31	4,149 59
5. laying house	1,632 01	2	1,599 37	150 91	1,750 28
6. manure shed	87 38	2	85 63	52 53	138 16
7. small henhouse	43 97	2	43 09	-	43 09

College Buildings, etc. — Concluded.

	Inventory at Beginning of Year.	Per Cent deducted.	Value at Beginning of Year less Deterioration.	Repairs and Improve- ments during Year.	Total Value at Close of Fiscal Year.
Poultry departments — <i>Con.</i>					
No. 8, breeding house	\$1,445 29	2	\$1,416 38	—	\$1,416 38
9, experimental breeding house	546 25	2	535 32	\$49 67	584 99
10, duck house	91 10	2	89 28	—	89 28
11, unit house for 200 hens	457 36	2	448 21	—	448 21
12, unit house for 100 hens	369 04	2	361 66	—	361 66
Power plant and storage building, including coal pocket	43,271 84	2	47,306 40	2,165 99	49,472 39
President's house	13,027 22	3	12,636 40	952 92	13,589 32
Rural engineering building	15,294 44	2	14,988 55	55 08	15,043 63
Sheep barn	1,343 03	3	1,302 74	6 04	1,308 78
South dormitory	40,358 38	2	39,551 21	1,400 55	40,951 76
Stable for calvary unit	18,149 31	3	17,604 83	151 98	17,756 81
Stockbridge Hall	164,430 81	2	161,142 19	973 60	162,115 79
Agronomy greenhouse	1,963 95	2	1,924 67	—	1,924 67
Stockbridge house	2,356 49	5	2,238 67	1 38	2,240 05
Stone Chapel	29,767 33	2	29,171 98	448 73	29,620 71
Turbine house	18,067 43	2	17,706 08	—	17,706 08
Vegetable plant house	4,365 31	5	4,147 04	1,106 29	5,253 33
Veterinary laboratory and stable	22,221 91	2	21,777 47	1,785 86	23,563 33
Waiting Station	507 27	2	497 12	5 99	503 11
Wilder Hall	33,085 64	2	32,423 93	87 75	32,511 68
Young stock barns	5,508 46	3	5,343 21	1,015 23	6,358 44
	\$1,238,479 25	—	\$1,209,228 36	\$32,639 13	\$1,241,867 49

College Equipment (Estimated Value).

Administrative division:					
Dean's Office					\$1,256 35
President's Office					2,605 00
Registrar's Office					1,270 15
Treasurer's Office					5,196 82
Agricultural division:					
Agronomy					8,717 52
Animal Husbandry					1,014 87
Dairy					23,721 29
Farm					24,531 45
Farm Live stock					30,131 00
Farm Management					949 72
Freshman Agriculture					107 55
General Agriculture					2,401 12
Poultry					11,169 11
Rural engineering					7,225 75
Domestic science					3,891 41
Dining Hall					36,303 19
Extension					13,582 14
General science:					
Apiary					2,216 23
Botanical					25,087 55
Chemistry					17,017 14
Entomology					5,888 33
Mathematics					2,312 30
Microbiology					6,937 15
Physics					7,619 59
Veterinary					14,318 29
Zoölogy and Geology					17,092 94
Graduate School					117 45

P.D. 31.		43
Horticultural division:		
Floriculture	\$33,178	42
Forestry	1,924	60
General Horticulture	7,598	03
Grounds	2,151	41
Horticulture Manufactures	5,414	75
Landscape Gardening	5,878	68
Market Garden Field Station	2,486	85
Mount Toby Reservation	297	21
Pomology	7,699	35
Vegetable Garden	4,252	58
Hospital	993	20
Humanities division:		
Economics and Sociology	199	70
Language and Literature	680	40
Library	132,663	80
Military	1,373	28
Operating and Maintenance:		
College supply	1,143	59
Fire Apparatus	1,534	50
General Maintenance:		
Office	822	82
Carpentry and Masonry Supplies	5,758	12
Carpentry and Masonry Tools	4,583	38
Electrical supplies	4,104	52
Electrical Tools	222	15
Electrical Commencement Supplies	619	75
Heating and Plumbing Supplies	10,598	01
Heating and Plumbing Tools	2,697	35
Painting Supplies	1,778	02
Painting Tools	227	03
Steam Main	54,511	10
Lighting Lines	9,904	30
Janitor's Supplies	1,283	30
Sewer Line	13,416	39
Water Mains	13,378	18
Power Plant		
General Equipment	106,485	45
Tools	337	35
Supplies	447	03
Fuel	23,648	75
Physical Education	1,839	82
Rural Social Science:		
Agricultural Economics	1,849	61
Agricultural Education	1,777	91
Rural Sociology	351	63
Short Course	2,033	44
Text Books	2,567	75
Trophy Room	1,200	00
Women's Dormitory	10,779	49
Memorial Hall	17,376	00
Totals	\$776,750	41

Experiment Station Buildings (Estimated Value).

	Inventory at Beginning of Year.	Per Cent.	Cost at Beginning of Year less Per Cent De- terioration.	Repairs and Improve- ments during Year.	Total Value at Close of Year.
Agricultural laboratory . . .	\$14,535 21	2	\$14,244 51	\$77 66	\$14,322 17
Agricultural barn . . .	4,076 13	3	3,953 85	276 56	4,230 41
Agricultural farmhouse . . .	1,610 53	3	1,562 21	96 26	1,658 47
Agricultural glasshouse . . .	331 71	5	315 12	12 05	327 17
Brooks house . . .	2,500 00	5	2,375 00	555 99	2,930 99
Brooks barn and sheds . . .	1,500 00	5	1,425 00	-	1,425 00
Cranberry buildings . . .	2,926 18	5	2,779 87	-	2,779 87
Entomological glasshouses . . .	615 80	5	585 01	-	585 01
Plant and animal chemistry labora- tory . . .	27,380 73	2	26,833 12	363 52	27,196 64
Plant and animal chemistry barns . . .	5,103 44	3	4,950 34	395 94	5,346 28
Plant and animal chemistry dairy . . .	1,567 49	3	1,520 47	-	1,520 47
Six poultry houses . . .	717 15	2	702 81	-	702 81
Tillson house . . .	950 07	5	902 57	96 20	998 77
Tillson barn . . .	928 54	5	882 11	-	882 11
Tillson poultry houses (4) Nos. 2, 3, 4, 5 . . .	2,749 75	2	2,694 75	259 29	2,954 04
Tillson incubator cellar No. 1 . . .	713 50	2	699 23	21 36	720 59
Tillson summer sheds (3) No. 6 . . .	-	-	-	276 96	276 96
Tillson pullet brooder No. 7 . . .	-	-	-	1,091 26	1,091 26
Tillson Hen Brooder No. 8 . . .	-	-	-	1,174 46	1,174 46
	\$68,206 23		\$66,425 97	\$4,697 51	\$71,123 48

Experiment Station Equipment.

	Estimated Value.
Apiary . . .	\$147 56
Agricultural Economics Department . . .	415 92
Agricultural Laboratory . . .	8,824 48
Agronomy Department . . .	187 50
Botanical Laboratory . . .	7,368 83
Chemical Laboratory . . .	26,822 52
Cranberry Station . . .	3,868 58
Director's Office . . .	5,179 59
Entomological Laboratory . . .	24,325 70
Meteorological Laboratory . . .	778 00
Microbiological Laboratory . . .	3,256 45
Pomology . . .	4,582 72
Poultry Department . . .	6,987 90
Treasurer's Office . . .	982 67
Veterinary . . .	1,527 35
Total . . .	\$95,255 77

Summary.

Land . . .	\$144,938 08
College buildings . . .	1,241,867 49
College equipment . . .	776,750 41
Experiment Station buildings . . .	71,123 48
Experiment Station equipment . . .	95,255 77
Total . . .	\$2,329,935 23

	Acres.
College estate (area) . . .	702.19
Cranberry Station, Wareham (area) . . .	23.67
Market Garden Field Station, Lexington (area) . . .	12.00
Mount Toby demonstration forest (area) . . .	755.27
Rifle range . . .	46.20
Pelham quarry . . .	.50
Total acreage . . .	1,539.83
Cornelia Warren estate ¹ . . .	50.00
	1,589.83

¹ This property was received from the trustees of the Cornelia Warren estate under date of March 29, 1923, but no appraisal made. The property being under lease until October 1, 1923.

STUDENTS' TRUST FUND ACCOUNT.

	Disbursements, Year ending Nov. 30, 1923.	Receipts, Year ending Nov. 30, 1923.	Balance on Hand.	Balance brought forward Dec. 1, 1922.
Athletics	\$22,183 70	\$21,486 94	—\$401 70	\$295 06
Dining Hall	92,079 30	88,918 41	—3,117 62	43 27
Keys	58 50	56 50	84 00	86 00
Students' deposits	49,264 53	46,916 71	12,518 25	14,866 07
Social Union	4,068 10	3,668 60	83 57	483 07
Textbooks	9,706 01	9,948 33	1,322 54	1,080 22
Athletic Field	—	—	169 70	169 70
Uniforms	4,757 80	6,133 54	4,871 04	3,495 30
Cow-Testing	18,513 92	18,508 22	2,214 64	2,220 34
Totals.	\$200,631 86	\$195,637 25	\$17,744 42	\$22,739 03
Balance beginning fiscal year.	—	22,739 03	—	—
Balance on hand Nov. 30, 1923	17,744 42	—	—	—
Totals.	\$218,376 28	\$218,376 28	—	—

CONDENSED OPERATING STATEMENT OF THE DINING HALL.

	Operating Charges.	Income.
1922. Dec. 1, Balance		\$43 27
1923. Nov. 30, Total Disbursements	\$92,079 30	—
Outstanding bills	2,992 17	—
Total collections	—	88,918 41
Accounts outstanding	—	1,465 17
Inventory	—	8,139 32
Balance	3,494 70	—
Totals.	\$98,566 17	\$98,566 17

ENDOWMENT FUND.¹

	Principal.	Income.
United States grant (5 per cent)	\$219,000 00	\$7,300 00
Commonwealth grant (3½ per cent).	142,000 00	3,313 32
	—	\$10,613 32

BURNHAM EMERGENCY FUND 1923.

	Market Value Dec. 1, 1923.	Par Value.	Income.
Two bonds American Telephone and Telegraph Company 4s, at \$925	\$1,850 00	\$2,000 00	\$80 00
Two bonds Power Corporation of N. Y. 6½s at \$1,000	2,000 00	2,000 00	130 00
One United States Liberty Bond 4½s \$980	490 00	500 00	21 25
One bond Ohio Service Company 6s \$990	495 00	500 00	30 00
	\$4,835 00	\$5,000 00	\$261 25
Louisville Gas & Electric Company	—	—	17 50
Western Electric Company	—	—	49 72
Unexpected balance Dec. 1, 1922	—	—	492 06
Extra expense in transfer of bonds	—	—	\$820 53
	—	—	30 47
Disbursements for fiscal year ending Nov. 30, 1923	—	—	\$790 06
	—	—	696 97
Cash on hand Nov. 30, 1923	—	—	\$93 09
Disbursements:			
Boys Camp	\$30 19		
Legislature	596 78		
Prizes	70 00		
	\$696 97		

¹ This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

LIBRARY FUND.

	Market Value Dec. 1, 1923.	Par Value.	Income.
Five bonds New York Central & Hudson River Railroad Company 4s at \$890	\$4,450 00	\$5,000 00	\$200 00
Five bonds Lake Shore & Michigan Southern Railroad Company 4s at \$940	4,700 00	5,000 00	200 00
Two shares New York Central & Hudson Railroad Company stock at \$104	208 00	200 00	12 00
Amherst Savings Bank, deposit.	167 77	167 77	7 59
Disbursements for fiscal year Nov. 30, 1923	\$9,525 77	\$10,367 77	\$419 59
	-	-	419 59

SPECIAL FUNDS.

Endowed Labor Fund (the Gift of a Friend of the College).

Two bonds American Telephone and Telegraph Company 4s at \$925	\$1,850 00	\$2,000 00	\$80 00
Two bonds Lake Shore & Michigan Southern Railroad Company 4s at \$940	1,880 00	2,000 00	80 00
One bond New York Central Railroad Gold Debenture 4s	890 00	1,000 00	40 00
One Bond Ohio Service Company 6s	990 00	1,000 00	60 00
Amherst Savings Bank, deposit.	143 39	143 39	6 49
One United States Liberty Bond 4½s	980 00	1,000 00	42 50
Unexpended balance Dec. 1, 1922	\$6,733 39	\$7,143 39	\$308 99
Louisville Gas & Electric Company	-	-	330 31
Extra expense in transfer of bonds	-	-	\$674 30
Cash on hand Nov. 30, 1923	-	-	9 67
			\$664 63

Whiting Street Scholarship Fund.

One bond New York Central Railroad Gold Debenture 4s	\$890 00	\$1,000 00	\$40 00
Amherst Savings Bank, deposit.	271 64	271 64	12 32
Unexpended balance Dec. 1, 1923	\$1,161 64	\$1,271 64	\$52 32
	-	-	555 65
Cash on hand Nov. 30, 1923	-	-	\$607 97

Hills Fund.

Two United States Liberty Bonds 4½ at \$980	\$1,960 00	\$2,000 00	\$85 00
One bond American Telephone and Telegraph Company 4s at \$925	925 00	1,000 00	40 00
One bond New York Central & Hudson River Railroad Debentures, 4s at \$890	890 00	1,000 00	40 00
One bond New York Central Railroad Debenture 4s at \$900	900 00	1,000 00	40 00
Three bonds Pacific Telephone & Telegraph Company 5s at \$970	2,910 00	3,000 00	150 00
One Penn. Public Service Corporation 6s	1,000 00	1,000 00	60 00
Boston & Albany Railroad Stock 3 5/8 shares at \$150	544 00	362 00	31 68
Amherst Savings Bank, deposit.	72 75	72 75	3 28
Electric Securities Company bonds 1 9/50 bonds at \$950	1,121 00	1,180 00	59 00
Two bonds Great Western Light & Power Company 6s at \$1000	2,000 00	2,000 00	120 00
Unexpended balance Dec. 1, 1922	\$12,322 75	\$12,614 75	\$628 96
Louisville Gas & Electric Company	-	-	1,918 82
Western Electric Company	-	-	70 00
Extra expense in transfer of bonds	-	-	\$2,642 64
	-	-	26 17
Disbursements for fiscal year ending Nov. 30, 1923	-	-	\$2,616 47
Cash on hand Nov. 30, 1923	-	-	276 99
			\$2,339 48

Mary Robinson Fund.

Amherst Savings Bank deposit	\$142 00	\$142 00	\$6 45
Boston & Albany Railroad stock, 3/8 share at \$150	56 00	38 00	3 32
Electric Securities Company bonds 41/50 bond at \$950	779 00	820 00	41 00
Unexpended balance Dec. 1, 1922	\$977 00	\$1,000 00	\$50 77
	-	-	444 61
Disbursements for loans made to students from the D. K. Bangs fund and unpaid	-	-	\$495 38
Cash on hand Nov. 30, 1923	-	-	305 00
			\$190 38

Grinnell Prize Fund.

	Market Value Dec. 1, 1923.	Par Value.	Income.
Ten Shares New York Central & Hudson River Railroad stock at \$104	\$1,040 00	\$1,000 00	\$60 00
Unexpended balance Dec. 1, 1922	—	—	245 74
	\$1,040 00	\$1,000 00	\$305 74
Disbursements for Prizes	—	—	50 00
Cash on hand Nov. 30, 1923	—	—	\$255 74

Students' Loan Fund of the Massachusetts Agricultural Club.

First National Bank	\$500 00	\$500 00	—
Total Loans to students	—	300 00	—
	—	—	\$200 00
Amount of Loans paid by students	—	—	50 00
Balance on hand Nov. 30, 1923.	—	—	\$250 00

Gassett Scholarship.

One bond New York Central & Hudson River Debenture 4s at \$890	\$890 00	\$1,000 00	\$40 00
Amherst Savings Bank Deposit.	11 64	11 64	48
	\$901 64	\$1,011 64	\$40 48
Unexpended balance Dec. 1, 1922	—	—	425 78
Cash on hand Nov. 30, 1923	—	—	\$466 26

Massachusetts Agricultural College (Investment).

One share New York Central & Hudson River Railroad stock	\$104 00	\$100 00	\$6 00
Unexpended balance Dec. 1, 1922	—	—	110 45
Cash on hand Nov. 30, 1923	—	—	\$116 45

Danforth Keyes Bangs Fund.

Two bonds Pacific Telephone and Telegraph Company 5s at \$970	\$1,940 00	\$2,000 00	\$100 00
Two bonds Union Electric Light and Power Company 5s at \$940	1,880 00	2,000 00	100 00
Two bonds American Telephone and Telegraph Company 4s at \$925	1,850 00	2,000 00	80 00
One United States Liberty Bond 4½s	980 00	1,000 00	42 50
Interest from student loans	—	—	117 41
	\$6,650 00	\$7,000 00	\$439 91
Overdraft Dec. 1, 1922	—	—	—12 35
	—	—	\$427 56
Total loans made to students during fiscal year \$2,670.00	—	—	—
Cash received on account of students loans \$3,615.00	—	—	—
Excess of cash received over loans made	—	—	945 00
Cash on hand Nov. 30, 1923	—	—	\$1,372 56

John C. Cutter Fund.

One bond Pacific Telephone & Telegraph Co. 5s	\$970 00	\$1,000 00	\$50 00
Unexpended balance Dec. 1, 1922	—	—	66 43
	\$970 00	\$1,000 00	\$116 43
Disbursements for fiscal year ending Nov. 30, 1923	—	—	44 60
Cash on hand Nov. 30, 1923	—	—	\$71 83

William R. Sessions Fund.

One bond New York Central & Hudson River Railroad 6s at \$1,050.	\$525 00	\$500 00	\$30 00
Three United States Liberty Bonds, two at \$1,000 and one at \$500, 4½ at \$980	2,450 00	2,500 00	106 25
One bond Adirondack Light & Power Company 6s	990 00	1,000 00	60 00
One bond Southern Illinois Light & Power Company 6s	990 00	1,000 00	60 00
	\$4,955 00	\$5,000 00	\$256 25
Unexpended balance Dec. 1, 1922	—	—	340 06
	—	—	\$596 31
Disbursements for fiscal year ending Nov. 30, 1923	—	—	527 15
Cash on hand Nov. 30, 1923	—	—	\$69 16

Alvord Dairy Scholarship Fund.

	Market Value Dec. 1, 1923.	Par Value.	Income.
One United States Liberty Bond 4½	\$980 00	\$1,000 00	\$42 50
One bond Southern Illinois Light & Power Company 7s	1,020 00	1,000 00	70 00
Two bonds Great Western Power Company 6s at \$1,000	2,000 00	2,000 00	120 00
Unexpended balance Dec. 1, 1922	\$4,000 00	\$4,000 00	\$232 50
	—	—	1,160 11
Disbursements for fiscal year ending Nov. 30, 1923	—	—	\$1,392 61
	—	—	150 00
Cash on hand Nov. 30, 1923	—	—	\$1,242 61

J. D. W. French Fund.

Two bonds Southern Illinois Light & Power Company 6s at \$990	\$1,980 00	\$2,000 00	—
Two bonds Great Western Light & Power Company 6s at \$1,000	2,000 00	2,000 00	\$60 00
Four bonds Penn. Public Service Corporation 6s at \$1,000	4,000 00	4,000 00	35 00
Two bonds Ohio Service Company 6s at \$990	1,980 00	2,000 00	60 00
	\$9,960 00	\$10,000 00	\$155 00
Balance of income on hand.			
	—	—	667 70
Expense of purchasing bonds	—	—	\$822 70
	—	—	45 56
Disbursements for fiscal year ending Nov. 30, 1923	—	—	\$777 14
	—	—	30 75
Cash on hand Nov. 30, 1923	—	—	\$746 39

SUMMARY OF BALANCE ON HAND OF THE INCOME FROM FUNDS HELD IN TRUST
BY THE M. A. C.

Burnham Emergency Fund	\$93 09
Endowed Labor Fund	664 63
Whiting Street Scholarship Fund	607 97
Hills Fund	2,339 48
Mary Robinson Fund	190 38
Grinnell Prize Fund	255 74
Gassett Scholarship Fund	466 26
Massachusetts Agricultural College — Investment Fund	116 45
Danforth Keyes Bangs Fund	1,372 56
John C. Cutter Fund	71 83
William R. Sessions Fund	69 16
Alvord Dairy Scholarship Fund	1,242 61
Massachusetts Agricultural Club Fund	250 00
J. D. W. French Fund	746 39
	\$8,486 55
	250 00
	\$8,236 55

I hereby certify that I have this day examined the Massachusetts Agricultural College Account, as reported by the Treasurer, Fred C. Kenney, for the year ending November 30, 1923. All bonds and investments are as represented in the Treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

JAN. 2, 1924.

CHARLES A. GLEASON,
Auditor.

HISTORY OF SPECIAL FUNDS.

Burnham Emergency Fund. — A bequest of \$5,000. from T. O. H. P. Burnham of Boston made without any conditions. The Trustees of the College have used this fund in any cases of emergency where funds were not available. At present

the fund is intact and the income only has been used for such emergency matters as the Trustees have authorized. The fund now shows an investment of \$5,000.00.

Library Fund. — The library of the college at the present time contains 71,349 volumes. The income from the fund raised by the alumni and others is devoted to its increase, and additions are made from time to time as the needs of the different departments require. Dec. 27, 1883, William Knowlton gave \$2,000; Jan. 1, 1894, Charles L. Flint gave \$1,000; in 1887, Elizus Smith of Lee, Mass., gave \$1,315. These were the largest bequests and now amount to \$10,000.00.

Endowed Labor Fund. — Gift of a friend of the college in 1901, income of which is to be used for the assistance of needy and deserving students, \$5,000.00.

Whiting Street Scholarship Fund. — Gift of Whiting Street of Northampton, for no special purpose, but to be invested and the income used. This fund is now used exclusively for scholarship, \$1,000.00.

Hills Fund. — Gift of Leonard M. and Henry F. Hills of Amherst, Mass., in 1867, to establish and maintain a botanic garden, \$10,000.00.

Mary Robinson Fund. — Gift of Miss Mary Robinson of Medfield, in 1874, for scholarship, \$1,000.00.

Grinnell Prize Fund. — Gift of Hon. Wm. Claflin, to be known as the Grinnell agricultural prize, to be given to the two members of the graduating class who may pass the best oral and written examination in theory and practice of agriculture, given in honor of George B. Grinnell of New York, \$1,000.00.

Gassett Scholarship Fund. — Gift of Henry Gassett of Boston, the income to be used for scholarship, \$1,000.00.

Massachusetts Agricultural College Investment Fund. — Investment made by vote of trustees in 1893 to purchase one share of New York Central & Hudson River Railroad stock. The income from this fund has been allowed to accumulate, \$100.00.

Danforth Keyes Bangs Fund. — Gift of Louisa A. Baker of Amherst, Mass., April 14, 1909, the income thereof to be used annually in aiding poor, industrious, and deserving students to obtain an education in said college, \$6,000.00.

John C. Cutter Fund. — Gift of Dr. John C. Cutter of Worcester, Mass., an alumnus of the college, who died in August, 1909, to be invested by the trustees, and the income to be annually used for the purchase of books on hygiene, \$1,000.00.

Alvord Dairy Scholarship Fund. — Gift of Henry E. Alvord, who was the first instructor in military tactics, 1869-71, and a professor of agriculture, 1885-87, at this institution. The income of this fund is to be applied to the support of any worthy student of said college, graduate or postgraduate, who may be making a specialty of the study of dairy husbandry (broadly considered) with the intention of becoming an investigator, teacher or special practitioner in connection with the dairy industry, provided that no benefits arising from such fund shall at any time be applied to any person who then uses tobacco in any form, or fermented or spirituous beverages, or is known to have done so within one year next preceding, \$4,000.00.

William R. Sessions Fund. — In accordance with the request of my deceased wife, Clara Markham Sessions, made in her last will, I bequeath to the trustees of the Massachusetts Agricultural College, Amherst, Mass., the sum of \$5,000, it being the amount received by me from the estate of the said Clara Markham Sessions. The said \$5,000 to be kept by the said trustees a perpetual fund, the income from which shall be for the use of the Massachusetts Agricultural College; and according to the further request of my deceased wife; made in her last will, this is to be known as the William R. Sessions fund, and is to be a memorial of William R. Sessions; and it is my special request that the said trustees shall make record of the fact that this fund came from the estate of my deceased wife Clara Markham Sessions, in accordance with her request made in her last will, \$5,000.00.

J. D. W. French Fund. — The Bay State Agricultural Society gives to the trustees of the Massachusetts Agricultural College the sum of \$10,000. and some \$500. of accumulated interest, to be held by them and to be known as the J. D. W. French Fund. It is our desire as Mr. French was especially interested in Dairying and Forestry that the trustees use the income from this fund, so that in their judgment

it will do the greatest good to students in dairying and its allies, also Forestry, either as scholarships, loans, or prizes. We should prefer, however, that when it seems most advisable, the income be used to help pay the expense of a judging team to go from the Massachusetts Agricultural College to the National Dairy Show or National Livestock Show. Nathaniel I. Bowditch, Sec. & Treas., BAY STATE AGRICULTURAL SOCIETY. June 27, 1922. \$10,000.00.

Massachusetts Agricultural College Fund. — The Massachusetts Agricultural Club gave \$500. to be used as a scholarship fund to the Massachusetts Agricultural College to help out deserving students there, who intended seriously to go into agriculture, interest on loans not to be charged until after graduation, \$500.00.

Total of special funds, \$60,600.00.

FRED C. KENNEY, *Treasurer.*

Desk Copy Library

The Commonwealth of Massachusetts

DEPARTMENT OF EDUCATION

THE M. A. C. BULLETIN

Amherst, Mass.

Volume XVI

MARCH, 1924

No. 3

SUMMER SCHOOL

MASSACHUSETTS AGRICULTURAL COLLEGE

JUNE 30 — AUGUST 8

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FACULTY

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 JOHN PHELAN, A.M., *Director of Short Courses.*
 RALPH J. WATTS, B.Sc., *Secretary of the College.*
 FRED C. KENNEY, *Treasurer of the College.*
 HENRY S. GREEN, A.B., LL.D., *Librarian of the College.*
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 WINTHROP S. WELLES, B.Sc., *Professor of Agricultural Education, M. A. C. Agricultural Education.*

SUMMER SCHOOL CALENDAR

- June 28 — Registration, Social Union Room, North College, 9 A.M. to 5 P.M.
 June 30 — Classes begin.
 July 1 — Student Assembly.
 July 4 — Holiday. Classes held July 5.
 July 7 — Student Assembly.
 July 11 — Social Evening, Memorial Hall.
 July 12 — Excursion to Old Deerfield.
 July 14 — Student Assembly, Lecture Course Entertainment.
 July 18 — Social Evening.
 July 19 — Excursion.
 July 21 — Student Assembly, Lecture Course Entertainment.
 July 25 — Social Evening.
 July 26 — Excursion — Picnic at Orient Springs.
 July 28 — Student Assembly, Summer School Dramatic Club will present plays.
 August 1 — Social Evening.
 August 2 — Excursion.
 August 4 — Student Assembly, Summer School Dramatics.
 August 9 — Close of Summer Session.

APPLICATION FOR ENROLLMENT

Name _____ Date _____
Post Office _____ Street _____ State _____
Present Occupation _____
Previous education _____
Subjects _____

Name and address of person to whom word may be sent in case of illness or accident:

Kindly give us the names and addresses of two persons to whom we may refer for a statement of character.

1. _____
2. _____

CERTIFICATE OF CITIZENSHIP

PRESIDENT'S OFFICE.

The Massachusetts Agricultural College charges a tuition fee of \$30 for the Summer Session to students who are not residents of Massachusetts. In order to satisfy the college authorities that an applicant is entitled to free tuition they require a statement, signed by the clerk of the city or town in which the applicant resides, certifying to the fact that the father of the applicant is a legal resident of said city or town. Such a statement may be made on the form below. If this is not presented when the student registers, the Treasurer has no option but to collect tuition on the above basis.

KENYON L. BUTTERFIELD.

APRIL 28, 1924.

To the President of the Massachusetts Agricultural College.

This is to certify that on the date specified below, the father of _____

is a legal resident of _____

City

State

Signed _____

Town or city clerk

Date _____

(Seal)

Mail this blank with your application blank to

JOHN PHELAN, *Director of Short Courses*

MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST, MASS.

GENERAL ANNOUNCEMENT

Organization. — The seventeenth session of the summer school at the Massachusetts Agricultural College will begin June 30 and continue until August 8 inclusive. With the exception of the preparatory courses intended for students planning to enter college in the fall, only graduate and under-graduate work will be offered.

Admission. — There are no formal examinations for admission to the summer session. Students, both men and women, will be admitted to such courses as the instructors in respective courses find they are qualified to pursue with advantage.

The summer school program is arranged for:

1. School superintendents and teachers connected with high schools, normal schools, colleges and universities who seek advanced instruction either with or without relation to an academic degree.
2. College students who desire to further their regular college work.
3. Teachers who desire to pursue courses that will better prepare them for their work.
4. Graduates of high schools who are planning to enter college in the fall and who have not the required number of entrance units.
5. Any serious student who finds in the summer school bulletin courses suited to his preparation and needs.

Registration. — Classes will begin promptly at 8 A.M. Monday, June 30, and will be held as announced in the description of courses until Friday, August 8, inclusive.

Students who are not candidates for a degree at the Massachusetts Agricultural College and who do not intend to become a candidate for such a degree during the coming summer and students previously enrolled as candidates for a degree in the Massachusetts Agricultural College may register by mail prior to June 25 or in person on Saturday, June 28.

The hours of registration are from 9 A.M. to 5 P.M. Students arriving in Amherst on these dates and between these hours should report immediately at the Social Union Room or at the office of the Director of Short Courses in South College (telephone 424), where full information may be had as to board, rooms, registration, etc.

Students intending to enroll for the first time this summer for work to be credited toward a degree at the Massachusetts Agricultural College should register in person on or before Saturday, June 28. Such students should correspond with the Dean or the Registrar of the College.

Students who do not wish definitely to enroll at this time for a degree may later present the work done for credit toward a degree when the regular conditions of college matriculation and registration for a degree have been met.

Registration of Graduate Students. — Graduate students who are not candidates for an advanced degree in the college are not required to file records of past training but should consult the Director of the Graduate School and secure his permission before registering for any courses. Such students will receive from the Director of the Graduate School upon request a statement of the work completed in the Summer Session. Graduate students who wish credit at the Massachusetts Agricultural College must meet the requirements of the graduate school.

Admission. — Admission to the graduate school will be granted:—

1. To graduates of the Massachusetts Agricultural College.
2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the instructor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for membership in the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Change of Program. — Regular exercises will begin promptly on June 30. Notice of any proposed addition or cancellation of courses must be reported at once in person at the office of the Director of the Summer Session. Students will be allowed after securing the consent of the Director to make such additions or cancellations up to and including July 2. After July 2 they will be permitted to make no changes whatever. A student attending any course is required to do the full work assigned to the class. Absences from class exercises on account of illness may be excused only when certified by a physician.

Credits. — All courses are measured both in terms of credit units and, for the convenience of the college, in clock hours. A credit is earned by carrying a course that meets two hours a week throughout a term of six weeks. In accordance with this definition a course which meets five hours a week for a term of six weeks would count as two and one-half credits. For each lecture or recitation hour the student is expected to give two hours out of class preparation for required reading, study, the working of problems, etc. As a rule two hours of laboratory work are considered the equivalent of one hour of lecture or recitation.

The value of courses is stated also in terms of clock hours based on the regular twelve week term of the college year. A clock hour is the equivalent of one lecture or recitation per week throughout a term of twelve weeks. The hours spent at preparation are counted also in the total. Thus, a course that meets for one lecture per week with two hours of outside study, counts as three clock hours. A course meeting daily with two hours of outside preparation counts as fifteen clock hours. The total amount of collegiate credit which may be earned can not exceed $7\frac{1}{2}$ term credits.

Housing for Women Students. — The new women's dormitory will be available for women students. There are thirty double and thirty-eight single rooms. A uniform rate of \$3.00 per week will be charged each student. *Each one will be required to supply her own blankets, sheets, pillow cases, etc.* Convenient arrangements for laundry work may be made in Amherst. *Students taking rooms in the dormitory must conform to dormitory regulations.* Observance of these regulations is one of the conditions under which the rooms are rented and failure to comply with the regulations will mean a surrender of the room and a forfeiture of the amount paid.

All requests for dormitory rooms must be made to the Treasurer of the college. A deposit of \$2 is required in order to secure a reservation in the dormitory. Students will be notified by the Treasurer, upon receipts of the fees, as to the location of the room. In case any change is desired, the request should be made immediately. Deposits will not be refunded after the beginning of the summer session. The deposit is applied to the payment for the room.

Cost of Living. — Good board with comfortable rooms can be secured at moderate prices as follows:

Single room \$2.50-\$4.00 per week; double rooms or suites for two persons \$2.00-\$3.00 per person; board \$7.00 per week and up. A list of rooms available in the village will be furnished to summer school students at the time of registration. Every effort will be made by those in charge to see that every one has comfortable accommodations.

The college will maintain a cafeteria on the self-service plan in Draper Hall, on the college grounds. Board may be had at from \$6.00 to \$8.00 per week. Good boarding places can also be secured outside of the college if desired.

The Summer Session offers many advantages. Amherst is a quiet college town located in the beautiful Connecticut Valley. The living conditions are excellent and especially desirable for students who wish to spend a part of the summer in

study in restful surroundings. The social life of the Summer School is attractive. A series of informals, Saturday excursions, lectures, entertainments and picnics have been arranged. There are many attractive places, groves, brooks, woods, picnic grounds near Amherst easily accessible. A new dormitory provides comfortable accommodations for women students. For men students rooms near the college may be had.

Classes will be kept small in order that the student may have personal attention from the instructor. The instruction will be given by regular members of the college staff assisted by outside specialists chosen in both instances for their achievements in their special field.

Tuition, Fees and Expenses. — Tuition is free for residents of the Commonwealth of Massachusetts. Non-resident students must pay a tuition fee of thirty dollars for the summer session. An entertainment course fee of \$2.00 is charged.

The total estimated expenditure for attendance at the summer session need not exceed: Board for six weeks, \$42.00; Room rent six weeks, \$18.00; Books, \$5.00; Laundry — incidentals; Lecture and entertainment course ticket, \$2.00.

Assemblies. — A student assembly is held once a week on Monday, from 6:30 to 7:00 P.M. At this assembly the notices of the summer session are given, reports of social and other committees made and other business of interest to the student body is transacted. Attendance is required of students unless excused by the Director of Short Courses. A lecture, entertainment and musical program is held in Bowker Auditorium, Stockbridge Hall, on Monday evening of each week from 7.30 to 9.00.

Informals. — At regular intervals through the session informal social gatherings will be held in the gymnasium. It is the desire of the committee to provide recreational and social life on the campus so long as it does not interfere with the regular collegiate work. Every effort will be made to give those in attendance an enjoyable summer. The college campus and the surrounding country is particularly adapted for recreational life. It is the custom of the College that all socials should first have the approval of some recognized College authority.

Rules and Regulations. — As a guide to those who come to the College for the first time, the following extracts are taken from the regular rules of the College: —

The customary high standard of college men and women in honor, manliness, self-respect, and consideration for the rights of others constitutes the standard of student deportment.

It should be understood that the College, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend but also to name conditions under which students may remain in the institution.

It is the custom of the College that all socials should first have the approval of some recognized College authority.

The College. — The College campus occupies an attractive site three-quarters of a mile north of Amherst center. It is connected with the town and the railway station by electric car service. The College has over 700 acres of land, most of which is in a high state of cultivation, and illustrates most of the leading agricultural industries of Massachusetts. There is a large range of greenhouses of the most modern and approved type; there is a modern dairy barn with dairy cattle; there are good horses, pure-bred swine, sheep and poultry; there are fields of corn, potatoes, clover, and grass in season; orchards of apple, peach, plum, and pear trees; tracts of good forest land, nurseries, and market gardens. There are also considerable tracts devoted to experiments, many of which are of unusual interest. Then there are well-equipped departments of botany, entomology, and chemistry, dealing in the most thorough manner with these special sciences. The advantages of the plant, equipment, and teaching staff are made available to Summer School students.

The Library. — The College library occupies the entire Chapel-Library building. It contains more than 65,000 volumes in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, econ-

omics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

Summer School students should be able to find excellent material for their line of College work, and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

The library hours are from 8 A.M. to 12 M. and 1 P.M. to 5 P.M. every week-day except Saturday when the library closes at noon.

COLLEGIATE COURSES

Education: Special Methods of Teaching Vocational Agriculture, Methods of Teaching Mathematics in High School, Methods of Teaching English in High School, Educational Psychology, Principles of Secondary Education, Principles and Methods of Teaching, Methods of Teaching Home Economics, Mental Tests, Supervised Teaching.

Home Economics: Foods, Home Management, Clothing, Millinery.

Science and Allied Courses: General Science, Studies in Science, Public Health, Rural Sociology, Principles of Democracy. Floral Arrangement, Flower Growing, Food Preservation, Dramatics, Design and Practical Arts.

FRESHMAN AND PREPARATORY COURSES

Sub-Freshman Courses for College Entrance Credit: Algebra, English Composition.

Freshman Courses: English Composition, Mathematics.

COURSES IN EDUCATION AND ALLIED SUBJECTS

Methods of Teaching English in the High School. — This subject is especially designed for those who teach or supervise English literature and composition. It offers training in the teaching of oral and written composition and the different types of literature. Attention is given to outside reading, the school paper, and other aids to English instruction. Each member of the class will be given opportunity to work out some individual problem which can later be used in actual teaching. Five class hours. Credit $2\frac{1}{2}$. Clock hours $7\frac{1}{2}$. *Mr. Boas.*

Method of Teaching and Supervision of Mathematics. — This course will be devoted to the problems of instruction in mathematics in secondary schools. The topics included in the course will be the reorganization of materials of mathematics in the junior and senior high schools. There will also be a thorough study of the modern testing movement in secondary mathematics which will include methods of using and scoring the more important tests in arithmetic, algebra, and mathematical ability. Five class hours. Credit $2\frac{1}{2}$. Clock hours $7\frac{1}{2}$. —

Educational Psychology. — Is a direct application of psychology to the field of education and is a basic course for both general and specific methods. The course deals fundamentally with the native equipment of human beings, individual differences, analysis of the learning process, transfer of training, psychology of special school subjects, assignment and distribution of school marks, etc. Ten hours per week. Credits 5. Clock hours 15. *Professor Glick.*

Mental Tests. — The course is introduced by a brief study of the factors which have been responsible for the development of mental tests. Some attention is also given to the general theory upon which mental tests are based. The main content of the course deals with the following: (1) kinds of mental tests, (intelligence, educational, vocational) and the purposes of each; (2) a direct study of the content and nature of the different types of tests; (3) administration and scoring; (4) evolution of data; (5) application of results, etc. Ten hours per week. Credits, 5. Clock hours 15. *Professor Glick.*

Principles and Methods of Teaching. — Consists of a study of the general principles of teaching applied to particular cases. These cases are gathered in part by the class during assigned observation visits to classes in session in public schools

and in part from the reports of the work of teachers. The attempt to solve the problems presented by these cases furnishes opportunity for fixing the ideas in methods. A good text in methods for secondary schools is the basis of the course. Ten class hours. Credits 5. Clock hours 15. *Professor Welles.*

Special Methods in Teaching Vocational Agriculture. — The work consists of outlining lessons and projects for the teaching of agriculture or related subjects in agricultural schools or departments; the application of principles of vocational education as embodied in the Smith-Hughes Act and other legislation relative to agricultural education; the necessary adjustments relating to the school, community and administrative officials. Ten class hours. Credits 5. Clock hours 15. *Professor Welles and State Dept. of Education.*

Supervised Teaching. — (Includes apprentice, practice and observation teaching.) Under certain conditions a student may absent himself from college during one term of his junior or senior year for supervised teaching. Such a procedure is particularly desired for those who are preparing to teach agriculture and is in accordance with the state plan which specifies the apprentice method of training. For detailed information consult the head of the department. Credits, 1 to 5, Clock hours 3 to 15. *Professor Welles.*

Principles of Secondary Education. — This is a study of the American high school, both junior and senior. It is designed to acquaint the student with the aims and objectives of the high school and the factors upon which the realization of these aims depend. Some of the specific topics included in the study are administration and supervision, financial support, course of study, qualifications of teachers and recent tendencies and policies in secondary education. Mr. Frank P. Morse and other members of the State Department of Education will assist in this course. Six class hours. Credit 3, clock hours 9. *Professor Welles.*

COURSES IN HOME ECONOMICS

Clothing I: A study of the clothing problem for the family considering what types of garments shall be bought ready made and what made at home. The use of color, line, and proportion in clothing, making and adapting of patterns; practice and construction of undergarments; children's clothing and variations of the useful tub frock. One two hour laboratory period and one lecture hour daily. Credit 5, Clock hours 15. *Mrs. Strahan.*

Millinery I: This course considers different types of hats, their appropriateness and becomingness, with practical work in remodeling of commercial frames and practice in making and trimming several hats. One two hour laboratory period and one lecture hour daily. Credit 5, Clock hours 15. *Mrs. Judy.*

Foods I: Principles of cookery with the meal as a working basis. This course gives the fundamental principles of selection and preparation of food. Emphasis is placed on the development of recipes from foundation formulæ and on the consideration of food costs in relation to the home budget. One two hour laboratory period and one lecture hour daily. Credit 5, Clock hours 15. *Miss Hall.*

Methods of Teaching Home Economics: A study of subject matter content, organization of courses of study, lesson plans. Consideration is given to different types of schools and to the trend of thought relative to education for homemaking. Four lectures per week. Credit 2, Clock hours 6. *Miss Craig.*

Home Management: An analysis of the essential factors in home and family life, and the relation of these interests to modern conditions in creating better homes. The many phases of economy, social needs, methods in routine and other subjects will be considered from the viewpoint of administrative responsibility. Four lectures per week. Credit 2, Clock hours 6. *Miss Craig.*

SCIENCE AND ALLIED COURSES

Food Preservation I. — This course aims to place before the student the latest and best methods in canning, evaporation, and the making of fruit and vegetable products, together with a study of the most approved types of equipment.

Fruits and vegetables will be canned in both tin and glass, using the hot-water bath, the water-seal canners, steam-pressure canners, and steam pasteurizer. Special attention will be given to the preservation of fruits and fruit juices for cu-

linary purposes. Both home and commercial types of evaporators will be used for evaporating such fruits and vegetables as are available.

The manufacture of various fruit products, such as jams, jellies, preserves, butters, pastes, and leathers will occupy about one-half the course. The home manufacture of vinegar, sauerkraut, hominy, and other commonly used products will be studied if time permits.

Special attention will be given to the utilization of the surplus and cheap grades of fruits and vegetables so frequently a source of loss to the grower.

The course is planned primarily for the housewife and the teacher, but much of the work may be adapted to the community center of the small home factory. This course is a practical one, in that all theories and principles discussed in lectures will be applied by the student in the laboratory work. Five lectures and five two-hour laboratory periods per week. Credit 5, Clock hours 15. *Professor Chenoweth.*

General Science A. — This subject emphasizes the methods of organizing and directing the activities and functions of a "General Science Course in High School". It considers the place of General Science in the curriculum, the methods of presentation, adaptation to local conditions and subject material. Five class hours, ten hours preparation. Credit $2\frac{1}{2}$, Clock hours $7\frac{1}{2}$.

General Science B. — This course may be elected by students taking Course A who wish help on their individual problems in the teaching of General Science. More attention will be given to the subject matter of the General Science course. Five class hours. Credit $2\frac{1}{2}$, Clock hours $7\frac{1}{2}$.

Studies in Science. — Physical, chemical and vital phenomena will be considered from the standpoint of underlying processes and laws for the purpose of correlating these expressions of nature in the habits, customs, thinking and life of man and society.

Recommended for teachers of science, superintendents and principals of high schools. Five class hours. Credit $2\frac{1}{2}$, Clock hours $7\frac{1}{2}$. *Dr. Marshall.*

Public Health. — This course will treat the following subjects: the human body in health and disease; individual, family and social elements; agencies of disease — nutrition, and food including milk, food poisoning and infection, air and ventilation, water and water supplies, sewage and sewage disposal, avenues of infection, susceptibility and resistance; communicable diseases, isolation and disinfection; public control; health laws and organization.

The course is designed to meet the needs of public school superintendents, principals, and teachers. Five class hours. Credit $2\frac{1}{2}$, Clock hours $7\frac{1}{2}$. *Dr. Marshall.*

Problems of Democracy. — This course will deal with the problems of modern democracy as they are likely to present themselves to boys and girls of high school age. It will treat not only of subject matter but the method of teaching in order that the economic social and political environment be better understood. Five class hours. Credit $2\frac{1}{2}$, Clock hours $7\frac{1}{2}$. *Professor Phelan.*

Rural Sociology. — The attention of the class will be directed to the study of the sociological problems as they present themselves in connection with rural life. The institutions of society as affected by the distribution of the movement of population and living conditions affecting health, recreation, the church, the school, will be surveyed. An analysis will be made of the values and standards of rural life. The influence of the environment, human and physical, will be considered in relation to progress. Five class hours. Credit $2\frac{1}{2}$. Clock hours $7\frac{1}{2}$. *Professor Phelan.*

Dramatic Presentation. — The great field for the drama in the rural communities as an aid to scientific methods in agriculture, high standards in rural life, and for self-development and delight, makes some knowledge of the interpretation of plays, of the stage and its parts, of its effective use and of the art of acting, very desirable. The members of this class will be rehearsed in several plays. Each member will appear in one or more plays. One or two of the best plays will be given a final presentation before the school. Two lectures and three two-hour practice periods. Credit $2\frac{1}{2}$, Clock hours $7\frac{1}{2}$. *Professor Patterson.*

Design and Practical Arts. — Lectures and laboratory work developing the value of design, color, and handwork as a rural school asset. Work in binding and

its various problems, basketry, elementary weaving, thin and thick cardboard construction, leather work, and rural dyeing; also other phases of rural prevocational subject matter; also rural community craft-work. Those taking this work should bring 9 by 12 inch drawing paper, carbon paper, scissors, ruler, eraser, knife, and pencils. Lecture daily, five two-hour laboratory periods. Credit 5, Clock hours 15. *Mr. Ried.*

Floral Arrangement. — A study of the principles underlying the arrangement and use of cut flowers and plants; basket and vase arrangements, table decorations, home, church, and other interior decorations; some time will be devoted to funeral designs; a study of color as applied to such work. Assigned readings. Two lectures and three two-hour laboratory periods per week. Credit 2½. Clock hours 7½. *Professor Thayer.*

Flower Growing. — A. Garden Flowers — This part of the course aims to familiarize the student with the methods of propagation and culture, use and value of the most important plants used in flower gardens, including annuals, biennials, perennials, bedding plants, bulbs, and roses. Soils and fertilizers, as applied to flower gardening, will be considered. The Department of Floriculture has a large garden devoted to the culture of annuals and perennials which provides material for study. B. Indoor Flower Growing — This work is intended for those who wish to grow plants indoors without the use of a greenhouse. It will include a discussion of soils, fertilizers, and containers; methods of propagation and culture of plants suitable for use in the schoolroom or in the home. The filling and care of baskets, window and porch boxes will be considered. Assigned readings. Five lectures and one two-hour laboratory period a week; six weeks. Credit 3. Clock hours 9. *Professor Thayer.*

FRESHMAN AND COLLEGE PREPARATORY COURSES

Freshman English. — English composition for Freshmen. This course is intended to teach straight thinking, sound structure, clear and correct expression. It will consist of lectures, recitations, theme writings and conferences. The amount of credit earned will depend upon the previous preparation of the student, since it is intended for college students who lack Freshman English credit. Five class hours. Credit 2½. Clock hours 7½. *Professor Patterson.*

Preparatory Algebra. — A review class will be offered in algebra covering the four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents, the formulas for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

The number in this class will be limited to twelve students so that each member of the class will receive individual instruction suited to his particular needs. Each student may advance in the work just as rapidly as his abilities permit. Those who do the work in a satisfactory manner and pass the examinations at the close of the course may present the work either for one or one and one-half entrance units of credit. Only students who already have some knowledge of mathematics should apply for this course. Five class hours, 10 hours required preparation. Credit 1½ units for entrance.

College Entrance English. — This course is intended for students who wish to earn credit in English for college entrance. The course will consist of a thorough review of English grammar, practice in home writing and in the analysis of library selections. Such credit for entrance will be allowed as the previous preparation of the student, his ability and time devoted to this subject warrant. Credit 1½ units for entrance. *Mr. Boas.*

Plane Geometry (Review). — The usual theorems and constructions of good

textbooks, including the relation of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids. Registration limited to students who have already had considerable knowledge of plane geometry. Credit 1 unit for entrance. Mr. _____

Higher Algebra (Review). — A review of radicals, quadratic equations, ratio and proportion, and progressions; graphs, binomial theorem, undetermined coefficients, summation of series, variation, continued fractions, determinants, permutations and combinations, logarithms, theory of equations. Intended only for students who are able to prove to the satisfaction of the instructor that their previous preparation in algebra is such as will enable them to carry this course in a satisfactory manner. Credit 3. Clock hours 9. *Professor Machmer.*

SHORT COURSES AT MASSACHUSETTS AGRICULTURAL COLLEGE

THE WINTER SCHOOL

The dates of this school are approximately from January 1 to March 10. The following subjects are offered: general agriculture, including agronomy, types and breeds, live-stock feeding, animal breeding, dairying, animal diseases, poultry husbandry, fruit growing, vegetable gardening, floriculture, horticulture, farm management, botany, entomology, sanitation and hygiene, farm structures, etc.; home-making, including foods, clothing, business of the household, and home care of the sick; professional improvement problems and agricultural education. The Winter School appeals to practical farmers and all who wish short, intensive, yet thorough courses suited to the practical man.

TWO-YEAR COURSE

The Two-Year Course is divided into seven sections, — dairying, animal husbandry, poultry, floriculture, horticulture, pomology, and vegetable gardening.

The first year consists of six months' study at the College and six months of required farm placement training, under the supervision of the College. During the placement period the student is expected to learn much of the practical side of his particular vocation. He is recommended to a position. These positions are on farms, in dairies, greenhouses, poultry plants. The nature of the position depends on the student's particular interest.

The second year consists of nine months' study at the College. On the completion of the course a certificate is granted. Tuition is free to residents of the Commonwealth.

ONE-YEAR VOCATIONAL POULTRY COURSE

This course is limited to 12 students. It begins January 1 of each year. Students are required to do a large amount of practical work at the College plant. It provides excellent training for the man who wishes to go into poultry as a business. In the past it has been one of the most popular of the Short Courses.

THE COURSE FOR COUNTRY CLERGYMEN

The program for this course is arranged each year to meet the needs of the clergy-men in small communities. A copy of the program may be had by writing to the College.

MASSACHUSETTS
AGRICULTURAL COLLEGE

ANNOUNCEMENT

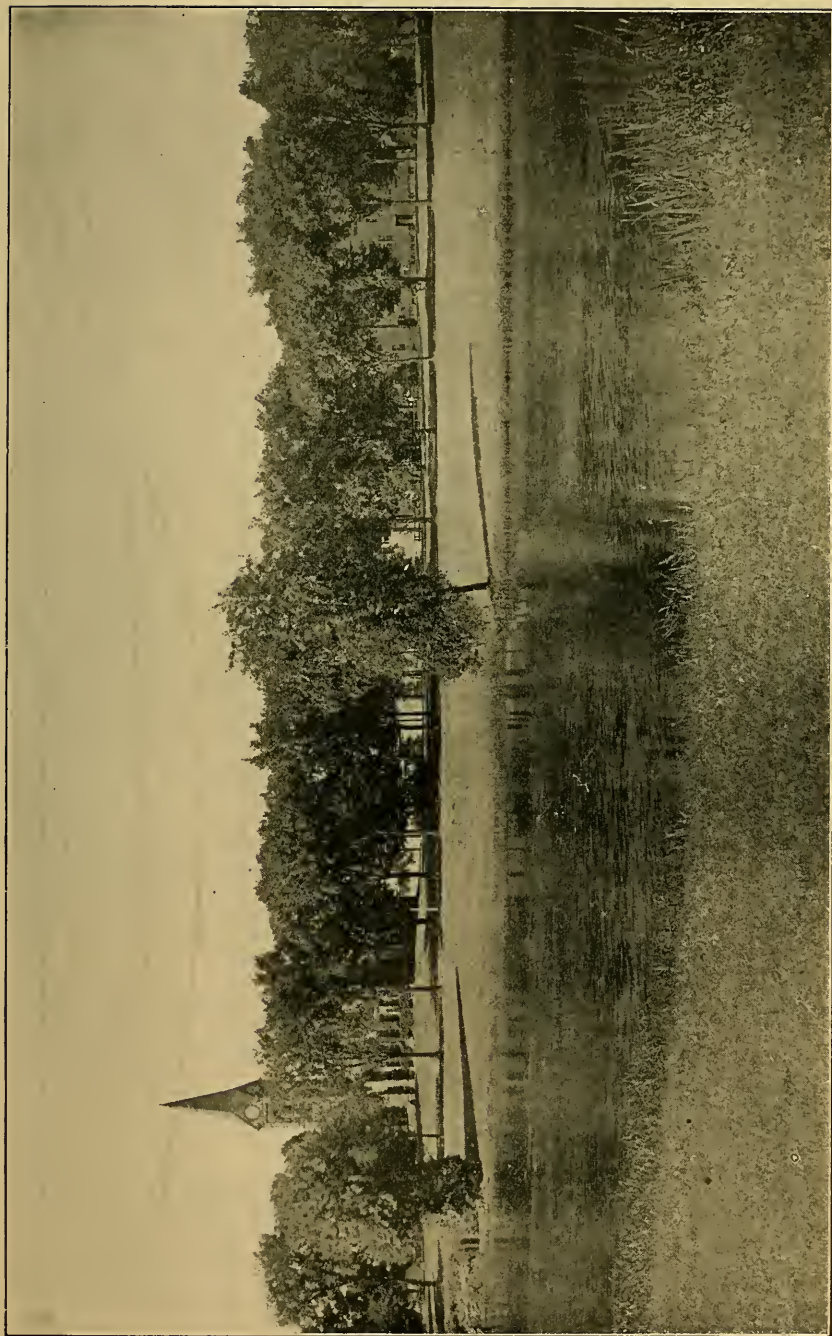
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TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

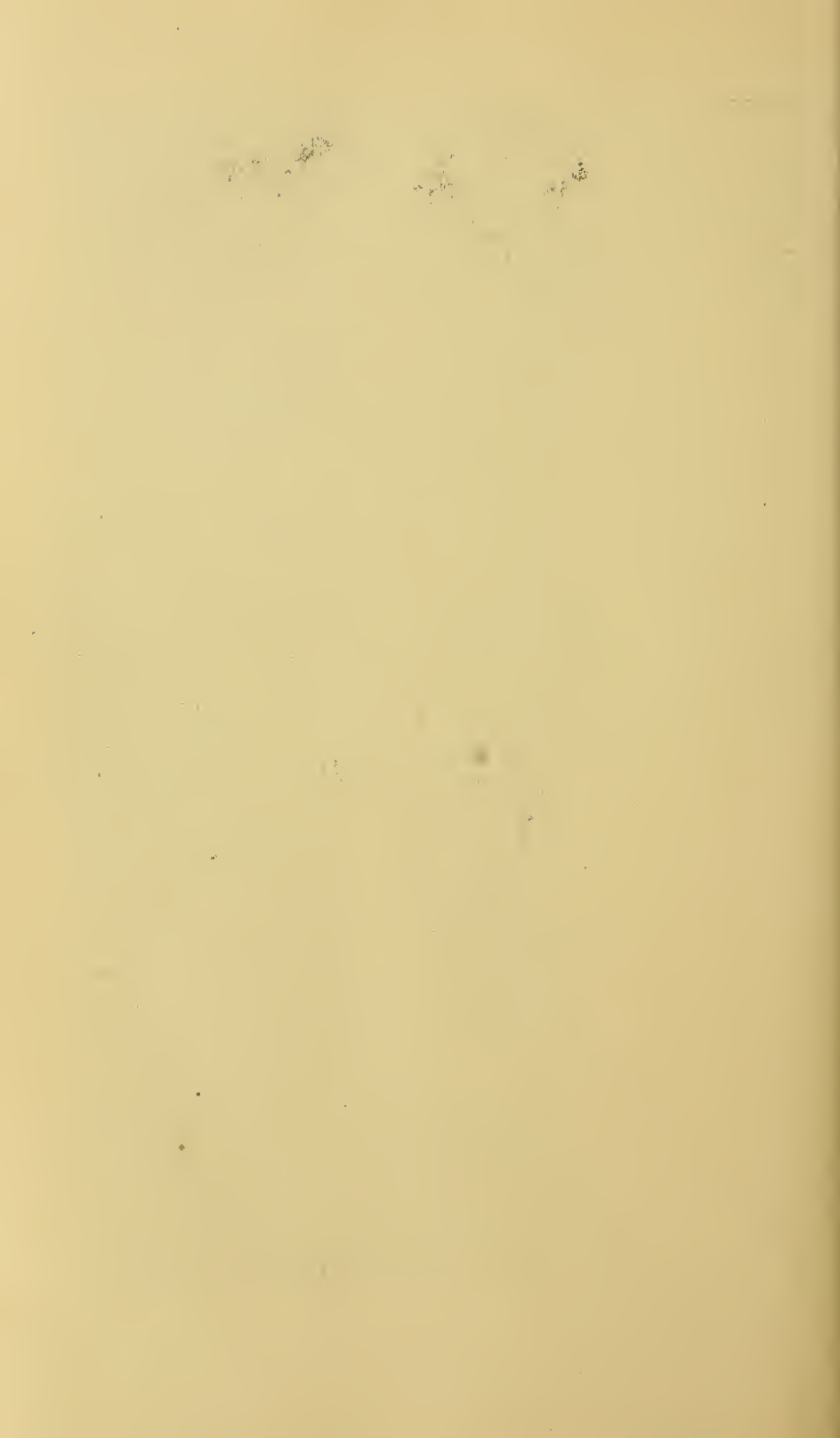
1924-1925



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A View of the Campus, showing Library



THE M. A. C. BULLETIN

Amherst, Massachusetts

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CALENDAR, 1924-1925

Two-Year Course

1924

September 15, 16, Monday, Tuesday		Registration
September 17, Wednesday, 1:30 P.M.		Fall term begins; assembly
October 13, Monday		Holiday, observance of Columbus Day
November 26-December 1, Wednesday, 12 M.; Monday, 7:30 A.M.		Thanksgiving recess
December 20, Saturday, 12 M.		Fall term ends
December 30, Tuesday, 7:30 A.M.		Winter term begins; chapel

1925

January 1, Thursday		Holiday, New Year's Day
February 23, Monday		Holiday, observance of Washington's Birthday
March 21, Saturday, 12 M.		Winter term ends
March 30, Monday, 1 P.M.		Spring term begins
April 20, Monday		Holiday, observance of Patriot's Day
May 30, Saturday		Holiday, Memorial Day
June 5-8, Friday-Monday		Commencement
September 14, 15, Monday, Tuesday		Registration
September 16, Wednesday		Fall term begins; assembly

STAFF

Officers of General College Administration

EDWARD M. LEWIS, A.M.

Acting President of the College

HENRY S. GREEN, A.B., LL.D.

Librarian of the College

WILLIAM L. MACHMER, A.M.

Acting Registrar of the College

FRED C. KENNEY

Treasurer of the College

EDWARD M. LEWIS, A.M.

Dean of the College

WILLIAM L. MACHMER, A.M.

Assistant Dean of the College

ROLAND H. VERBECK, B.Sc.

Director of Short Courses

RALPH J. WATTS, B.Sc.

Secretary of the College

The Faculty of Instruction

MAX F. ABELL, Ph.D.		North Amherst
<i>Assistant Professor of Farm Management</i>		
LORIN E. BALL, B.Sc.		Allen Street
<i>Instructor in Physical Education</i>		
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<i>Assistant Professor of Poultry Husbandry</i>		
MARY A. BARTLEY		50 Pleasant Street
<i>Instructor in Home Economics</i>		
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<i>Assistant Professor of Entomology</i>		
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<i>Professor of Horticultural Manufactures and Head of Department</i>		
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<i>Superintendent of Grounds</i>		
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<i>Instructor in Pomology</i>		
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<i>Instructor in Microbiology</i>		
GUY V. GLATFELTER, M.Sc.		10 Kendrick Street
<i>Assistant Professor of Animal Husbandry</i>		
LAURENCE R. GROSE, A.B., M.F.		45 Amity Street
<i>Professor of Forestry and Head of Department</i>		

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S. C. HUBBARD <i>Foreman, Department of Floriculture</i>	North Amherst
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CHARLES E. MARSHALL, Ph.D. <i>Professor of Microbiology and Head of Department</i>	44 Sunset Avenue
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MARION PULLEY, B.Sc. <i>Instructor in Poultry</i>	Fearing Street
GEORGE F. PUSHEE <i>Instructor in Rural Engineering</i>	North Amherst
NORMAN J. PYLE, D.V.M. <i>Assistant Research Professor of Avian Pathology</i>	Amherst House
GEORGE J. RALEIGH, M.Sc. <i>Instructor in Pomology</i>	M.A.C.
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HAROLD W. SMART, ATTORNEY <i>Instructor in Business Law</i>	Nash Block
RICHARD W. SMITH, B.Sc. <i>Instructor in Dairying</i>	17 Fearing Street
GRANT B. SNYDER, B.Sc.Agr. <i>Instructor in Vegetable Gardening</i>	Nash Block
JAMES L. STRAHAN, M.Sc. <i>Assistant Professor of Rural Engineering</i>	50 Amity Street
CHARLES H. THAYER <i>Instructor in Agronomy</i>	South East Street
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TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

The Two-Year Course in Practical Agriculture was organized in 1918 to meet the demand for a short course in agriculture that might be taken by students who either did not possess college entrance requirements, or who, for one reason or another, were unable to take the regular Four-Year Course.

Since its organization, at the request of the Massachusetts Legislature, the Two-Year Course in Practical Agriculture has registered 905 students. There are now 354 graduates of the course. Practically all of these are in Massa-

achusetts or in New England, but graduates of the course are to be found in Florida, California, and many other states of the Union.

The growth of the course and the demand for more specific vocational training made necessary a reorganization of the course in 1921. As now arranged the student may specialize in one of seven vocations,—animal husbandry, dairying, floriculture, horticulture, pomology, poultry and vegetable gardening. This specialization does not prevent his securing a general working knowledge of other subjects.

The Two-Year Course will appeal not only to young men and women, but also to men and women of mature years and practical experience who wish to know more about the business of farming.

FARM PLACEMENT

The work of placing students on farms is in charge of the supervisor of farm placement training. Farms are selected in the State that will enable a student to gain practical experience in his particular vocation. This farm experience may, by special arrangement, be secured on the home farm. As a rule, it will be found better for a student to spend this six months away from the home farm, even though he plans to be employed on the home farm after finishing the course. This statement is based on the experience of students who have already taken the course.

If credit is to be secured for the six months' placement training the following conditions must be carefully observed: (1) the student must interview the supervisor early in his first year in order that his qualifications, the type of farming he wishes to pursue, and his general fitness be determined; (2) no arrangement for placement training may be made by the student himself until the supervisor has been consulted; (3) students are required to complete their period of training without unnecessary absences; (4) no transfers are to be made by a student if he is to receive credit until permission has been had from the supervisor; (5) a position may not be given up by the student until the supervisor has been notified; (6) students will not be permitted to appear with the graduating class until the farm placement has been fully completed; (7) a monthly report must be furnished on the form supplied, and submitted not later than the fifth of each month during his training period. It should be clearly understood by both employer and employee that the same energy, regularity and general conduct will be expected of the student during his period of placement training as is expected in his work in classes and on the campus.

It should also be noted that this six months' farm experience is educational in its nature. Students are expected to earn and receive a reasonable wage, but the purpose of the training is the experience gained rather than the wage earned. The scale of wages may vary in different localities, but each man's ability is given very careful thought, that he may obtain a wage that is fair to him. In the event of any misunderstanding the supervisor should be immediately informed.

RULES AND REGULATIONS

Absences from Class

Regularity in attendance at all classes is required of the student body. It is expected that a student will not be absent except for good reasons. In the event of absences the work must be made up to the satisfaction of the instructor. Absences from exercises immediately before or after a holiday may not be taken without special permission. All applications to the Director for excuses of absence shall be made in writing and presented in person. They must, if possible, be made in advance. If they cannot be made in advance they must be made within two days after the expiration of the period of absence, and they must contain a full statement of the reason of the delay in presenting them.

A physician's certificate must be presented in case of absence on account of illness. Such certificates must be approved by the Professor of Physical Education and deposited with the Director of Short Courses within three days after the last absence covered by the certificate or they will be invalid. In the

record of absences two tardy marks shall be considered equivalent to one absence.

Absences from Examinations or Tests

Any student who absents himself from an appointed examination without sufficient cause shall be given zero thereon. In such case he shall not be entitled to a make-up examination unless the Director so requests. A previously announced test may, at the discretion of the instructor, be regarded as a test or as an examination.

Every absence taken before enrollment (the signing of the registration card by the teacher) in a class will be deducted from the student's absence allowance in that class. The Director, however, may grant the special privilege of a visitor's card.

General Information

INSTRUCTION.—The instruction is given by the regular faculty by means of classroom teaching, laboratory exercises and practical work. The work of the classroom is supplemented by demonstration work in the laboratory, dairy room, greenhouse and stables. It is designed to offer plain, practical, direct information, and to establish the underlying reasons as well as the method employed in the various operations. The advantages of the college staff of specialists and the college plant with all its resources are thus made available to young men and women electing this course.

ENTRANCE CONDITIONS.—Students must be seventeen years of age or over and have completed at least an elementary school course or its equivalent. They must have had six months' practical farm experience before they will be permitted to enroll for the work of the second year. This experience may be gained after the first year of study at the college. Application for registration must be made at least two weeks before the opening of the college year, and references furnished to whom the college may write concerning a student's ability and general character.

The Two-Year Course is not intended for students already enrolled in high schools. Such students should finish the high school course. Students enrolled in high schools who wish to take the course should bring a statement, either from the principal of the high school or from the parent or guardian, requesting enrollment.

CREDIT AND CERTIFICATE.—In order to obtain a certificate a student is expected to have satisfactorily completed all of the work called for in the general course which he has selected. A total of 100 credits is required for graduation. A credit is given for one class hour, of either recitation or lecture, per week throughout a term of twelve weeks. Each two-hour laboratory period also counts for one credit. The course calls for twenty credits each term, that is, four subjects meeting five times per week, either in class or laboratory. Upon the satisfactory completion of the course, the student is given a certificate showing the work he has done and the grades he has obtained. A certificate will not be issued to any student whose record shows a deficiency in any subject or in his farm placement training. At the close of each term students receive a formal report showing the standings given in the subjects pursued by them. If a student's work is unsatisfactory he may be asked to withdraw.

If a student's term mark in any subject falls below 60 per cent, or if he drops a course without the consent of the Director, he is thereby failed (F) in that subject. He shall be debarred from taking the final examination in that subject and must repeat it with the following class.

If the average of the term mark and the final examination is below 60 per cent, the student is thereby conditioned (#).

HOW TO ENROLL.—Each student is required to file with the treasurer of the college a statement, signed by the town (or city) clerk of the town (or city) from which he enrolls, stating that the parent or guardian of the student is a resident of that town. A blank for this purpose is inserted at the end of this catalogue. Upon arrival report at the office of the Director of Short Courses, located in South College, where information may be obtained in regard to board and room, schedule of classes, etc.

Student Expenses

TUITION.—Tuition is free to residents of Massachusetts. Students who are not residents of Massachusetts are charged a tuition fee of \$60 a term. The tuition charged persons not citizens of the United States is \$60 a term. *Students entering from Massachusetts are required to file with the President a statement, signed by either town or city clerk, stating that the applicant's father is a legal resident of Massachusetts; a similar statement is required of those entering from other States.*

All students entering the college for the first time in this course are charged a matriculation fee of \$5, which, in event of a student leaving the institution shall, if all bills due the college are paid, be remitted, or which shall upon graduation be considered as payment for the certificate.

LABORATORY FEES

The principles observed in establishing laboratory fees are the requirement that students pay for those materials actually used which cannot be supplied by the individual, and that the laboratory fees include a charge sufficient to guard against wanton waste and breakage. Fees may be established for any course without previous announcement. At present the fees charged are as follows:—

	Per Term
Agronomy S-1	\$1 50
Agronomy S-2	2 00
Animal Husbandry S-1, S-5	1 50
Animal Husbandry S-4	1 00
Dairying S-1, S-2, S-3, S-4	3 00
Floriculture S-3, S-5	3 00
Floriculture S-6	2 50
Horticulture S-1	1 00
Horticulture S-5, S-6, S-7	1 50
Microbiology S-2	5 00
Poultry S-1, S-2, S-3, S-4, S-5	2 00
Rural Engineering S-1, S-2, S-3, S-4, S-5, S-6, S-7	1 50
Vegetable Gardening S-1, S-2	1 50

INITIAL CHARGES

At the opening of the college year, before students are registered in their classes the following charges are payable at the treasurer's office:—

Matriculation fee	\$5 00	—
Board (if at college dining hall) four weeks in advance	28 00	\$28 00
Assessment for support of Social Union	1 50	1 50
Laboratory fees	See schedule	See schedule
Student tax for support of athletics ¹	15 00	15 00
Student tax for support of non-athletic activities ¹	3 50	3 50

¹ While this is not essentially a college charge, the Treasurer of the college acts as collector for the student activity, and all students are expected to make the payment as indicated. The subscription price of the "Collegian" is fixed by the managers, the amount of athletic tax by vote of the student body.

The necessary college expenses are estimated as follows:—

Tuition: citizens of Massachusetts, free; others \$180 a year.

	Low	High
Matriculation fee, first year	\$5 00	\$5 00
Room in private houses	72 00	110 00
Board, \$7 per week	252 00	252 00
Laundry, 50 to 85 cents a week	18 00	30 00
Laboratory fees	5 00	20 00
Books, stationery, and miscellaneous items	35 00	70 00
	\$387 00	\$487 00

The estimate given above is for the regular college year of nine months. The estimate for six months would be approximately two-thirds of the amount stated above.

Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial obligations voluntarily placed upon students which they should expect to meet. Chief among these are class assessments and taxes levied for maintenance of various organizations, such as the Social Union, Athletic Association, weekly publications, etc. Such expenses vary from \$15 to \$30 a year. Additional financial responsibility is also assumed by students joining clubs or entering into other social activities of the college. Besides the amount necessary for clothes and traveling, the economical student will probably spend between \$400 and \$500 per year.

Student Aid

SELF HELP.—Many students are obliged to find work of some sort to earn their way through college. It is recommended that no new student enter without having at least \$250 and preferably \$350 with which to pay his way until he can establish himself in some regular work. The college does not encourage students to enter without money in the expectation of earning their way entirely. The student will find it better either to work and accumulate money before coming to college, or to take more than two years in completing his course, or, instead, to borrow money sufficient to carry him through. No student should undertake work that interferes with his studies, and students should understand that, owing to the large number of applications for employment, no one man can receive a large amount of work at the college. A number of students find opportunities for earning money without depending upon the college to furnish them with work.

Application for student labor should be made directly to the President of the college. An applicant is required to present statements from parent or guardian and from a public official or other responsible person of the town or city in which he resides, explaining the necessity of the applicant's need of assistance. Students whose department or class work is not satisfactory are not likely to be continued in student labor. Opportunities for labor for Short Course men on the campus are limited to second-year men in the Two-Year Course in Practical Agriculture. Students, therefore, may find it rather difficult to obtain all the work they desire during their first year; as a matter of fact, however, any student who is capable of doing a variety of things, and who is a competent workman, usually finds little difficulty in obtaining all the work that he can do from the outset.

Rooms

Students must secure rooms approved by the college. The assignment of rooms, and the general supervision of the housing of students, is in charge of the Director of Short Courses.

Women students are expected to occupy rooms in the college dormitory and such houses or apartments as the college may provide, and board at the college dining hall. No woman student will be allowed to room in a private house without a special written permission from the Director.

General Exercises

Chapel exercises are held two mornings each week. On Wednesday an afternoon assembly is held, to which some prominent layman or professional man is invited to speak. The object of these assemblies is to bring to the students discussions of topics of present-day interest. A special chapel service on Sunday is usually held during the winter months. Students are required to attend these general exercises, although the President is authorized to excuse from chapel any student who may object to attendance thereon because of his religious scruples, provided his request for excuse therefrom is endorsed by his parent or guardian.

Student Activities

A large number of student organizations furnish opportunity to students for work and leadership.

The Massachusetts Agricultural College Social Union was established about fifteen years ago. All students become members of the Union by paying a small fee, and in the fall and winter months the Union gives a series of entertainments, free to students and faculty. The Memorial Building, recently erected, is the center of student activities. Offices for the various student organizations, including the Two-Year Student Council, will be maintained in this building. On the first floor are located a lounging room, the Memorial Room, and the offices; in the basement, bowling alleys, pool tables, store, post office, and barber shop; and on the second floor an auditorium for meetings and dances. This building was erected by the alumni, students, faculty, and friends in honor of the fifty-one "Aggie" men who gave their lives in the World War.

The Young Men's Christian Association is active both socially and religiously. A Catholic club has also been organized.

The Two-Year Council is composed of representatives of the first and second year classes. This body serves as general director of the conduct in classes of the Two-Year men, and represents before the faculty the interests of this group of students.

Student Relations

The customary high standard of college men in honor, manliness, self-respect, and consideration for the rights of others constitutes the standards of student deportment.

Any student known to be guilty of dishonest conduct or practice must be reported by the instructor to the President for discipline.

The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable.

It should be understood that the college, acting through its President or any administrative officer designated by him, distinctly reserves the right not only to suspend or dismiss students, but also to name conditions under which students may remain in the institution. For example, if a student is not doing creditable work he may not only be disciplined but he may be required to meet certain prescribed conditions in respect to his studies, even though under the foregoing rules his status as a student be not affected. The same provision applies equally to the matter of absences.

Similarly, also, it applies to participation in student activities. Though this will ordinarily be governed by the rules as already laid down, yet, if in the judgment of the college authorities a student is neglecting his work on account of these activities, the privilege of participating in them may be withdrawn for such time as is considered necessary. Moreover, it may be withdrawn as a punishment for misconduct. Prospective students or their parents may, upon application, obtain a copy of the faculty rules governing student relations to the college.

Infirmary

The college maintains an infirmary for the care of sick or injured students. The buildings now available for this purpose are quite inadequate for the needs of the institution, and it is hoped that in the near future other buildings of this kind may be erected and the general equipment somewhat amplified. At present two small buildings, built especially for hospital purposes, are used for the infirmary.

The following statement outlines the plan followed in the management of the infirmary with respect to students:—

MANAGEMENT OF THE INFIRMARY

Supervision

1. The infirmary is under the *general supervision* of Dr. Charles E. Marshall, who is designated as Supervisor of the Infirmary. A resident nurse is in *immediate charge* of the infirmary.

Use of Infirmary

2. Students are urged to go to the infirmary at any time that they are in need of the services rendered by the resident nurse or by a town physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that the majority of the students will go to the infirmary at his suggestion. This understanding, however, should in no way deter students from going to the infirmary voluntarily at any time.

General Health

3. Students are urged to consult the physical director or the resident nurse immediately when signs of physical disorder appear. Severe attacks of cold or other forms of illness can usually be avoided if treatment is administered in the incipient stage. The purpose of the infirmary is to help maintain the general good health of the students, as well as to furnish a suitable place for professional attention in cases of severe illness or accident.

General Fee

4. The infirmary fee will be at the rate of \$2 a day, and will be charged when one or more meals are obtained at the infirmary or when the student remains at the infirmary for one or more nights. A nominal charge will be made to out-patients for miscellaneous treatment of a minor character.

Additional Expenses

5. In addition to the fee charged as specified in paragraph 4, the following additional expenses will be charged to the patient:—

(a) *Nurses*.—In case a special nurse is required for the proper care of an individual, the services and board of this nurse will be paid by the patient. Such a nurse will be under the general supervision of the resident nurse.

(b) *Professional Service*.—If a student requires medical attention by a physician, he will be required to select his physician and become responsible for fees charged by the physician.

(c) *Supplies*.—Special medical supplies prescribed by a physician or nurse will be charged to the patient.

(d) *Laundry*.—Expense for personal laundry incurred by students while in the infirmary will be charged to the individual student.

The Library

The college library occupies the entire lower floor and basement of the Chapel-Library building. It contains more than 65,000 volumes, in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

An agricultural reference library is maintained in Stockbridge Hall. Other branch libraries and reading rooms are provided in the department buildings, and these are open for the use of the Short Course and regular college students.

The library hours are from 8 A.M. to 9.30 P.M. every week day, and from 9 A.M. to 1 P.M. on Sunday in term time. Shorter hours prevail during the vacation season.

Short Course students should be able to find splendid material for their line of college work and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

Agricultural Opportunities for Women

Agriculture is a field in which women are finding increasingly good opportunities. Poultry keeping, fruit growing, floriculture, dairying, truck farming, general farming,—all offer favorable openings for women. In all of these branches of agriculture women are farming independently. Women are also filling paid positions which include farm and estate managers and workers, garden supervisors, and workers in boys' and girls' agricultural clubs.

For the woman or girl whose home is already upon the farm the opportunity is exceptionally good. With the help of an agricultural education there are open to her many means of increasing her own or the farm income. With the knowledge of farm life which she already possesses, and with the possibility of securing occasional help from her family, she can easily carry on and develop a profitable enterprise of her own. The Two-Year Course in Agriculture will afford to the women who wish to engage in farming the practical training which they will need to fit them for their work, and will open to them new doors of opportunity. The particular problems which the women engaged in farming will have to meet, and the special lines of farming in which they will have favorable opportunities, will be considered in a series of conferences.

Women who are interested in taking agricultural courses should correspond with Miss Margaret Hamlin, who acts as adviser for agricultural courses for women. Women interested in home economics should address Miss Edna L. Skinner.

Positions

The college does not guarantee positions to students registered in any of its courses, but it has an opportunity to recommend students for a large number of positions. A record is kept of each student's work and of his farm experience, and of his success in positions for which he has been recommended after he has finished his course. The opportunities for trained men and women, especially those who have had farm experience, are exceptionally good.

A student desiring a recommendation from the college must meet the following conditions:—

- (1) He must be of good character.
- (2) His previous record must be good.
- (3) His work in all courses must be satisfactory.

Students who have not previously had a considerable amount of farm experience cannot, as a rule, be recommended for positions of responsibility. This is especially true of the better positions for which managers or superintendents are wanted.

ANIMAL HUSBANDRY

The course in Animal Husbandry is designed to give men a broad knowledge of the problems surrounding the breeding and production of farm live stock. It includes enough of the other general agricultural courses to give these men a rather broad view of practical agriculture as a vocation. It is designed to prepare men to become practical farmers as farm superintendents, herdsmen, shepherds or farm owners.

The Animal Husbandry Department is especially equipped to give good Animal Husbandry instruction having an excellent laboratory in Grinnell Arena. This arena has a seating capacity of 180, and is adapted to the showing of live stock for judging purposes.

The live-stock equipment consists of about 150 head of cattle, including both dairy, beef, and dual purpose animals. Of the dairy breeds, we have representatives of superior merit of the Guernsey, Jersey, Ayrshire and Holstein. Our beef breed is the Hereford, and our dual purpose breed, the Milking Shorthorn. A few steers are fed out each year. All of these animals are used for classroom purposes from the standpoint of practice judging, feeding, breeding, care and management.

Our sheep equipment is made up of very excellent individuals of both the Shropshire and Southdown breeds. These have been shown at the Eastern States Exposition and won many prizes. The students get practical work in the care and management, shearing and other problems of sheep husbandry.

In swine, we keep a herd each of the Berkshire and Chester White breeds. We have been using excellent sires and are developing two high-class herds.

For horses we have two pure-bred Percheron stallions, four pure-bred Percheron mares, as well as growing colts. We also have a number of work teams of different types which are used for classroom purposes.

All of the equipment in the barns is of practical and sensible type, and everything is available for the instruction of students in Animal Husbandry.

Animal Husbandry

<i>Fall Term</i>		<i>First Year</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agromony S-1 (Soils and Fertilizers)		Animal Husbandry S-2 (Principles of Feeding)		Six months' farm placement training
Animal Husbandry S-1 (Types and Breeds)		Microbiology S-1 (Hygiene and Sanitation)		
Dairy S-1 (General Dairy)		Motors S-2		
Poultry S-1		Business Law S-1		
<i>Fall Term</i>		<i>Second Year</i>	<i>Winter Term</i>	<i>Spring Term</i>
Animal Husbandry S-3 (Feeding Practice)		Animal Husbandry S-4 (Herd Book Study and Animal Breeding)		Animal Husbandry S-5 (Live-stock Management and Stock Judging)
Rural Sociology S-1 (Social and Economic Problems)		Pomology S-7 (general)		Agromony S-2 (Crops)
Rural Engineering S-1 (Farm Engineering)		Farm Management S-1 (Farm Management and Accounts)		Veterinary Science S-2 (Animal Diseases)
Construction ¹		Agricultural Economics S-1		Vegetable Gardening S-6 (general)

Courses in Home Economics and Agricultural Opportunities for Women may be had by arrangement.

¹ Construction — Rural Engineering S-7 + S-3.

Animal Husbandry S-1. (Types and Breeds.) I.

This course is a study of the history of the various breeds of cattle, swine, and horses; their origin and development; their characteristics; and a discussion of the conditions to which each breed seems best adapted. The laboratory work will give the student an opportunity to do practice judging, which will familiarize him with the different types and breeds. Textbook: Plumb, "Types and Breeds of Farm Animals."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Animal Husbandry S-2. (Principles of Feeding.) II.

A study of the fundamental principles of animal nutrition; of the composition and quality of feeding materials and their relative importance for the different classes of farm animals. The latter part of this course will be devoted to a study of feeding standards and the calculation of rations. Textbook: Henry and Morrison, "Feeds and Feeding."

5 class hours a week.

Credits, 5.

Animal Husbandry S-3. (Feeding Practice.) I.

This course will consist of a study of the feeding, care, and management of all classes of live stock, giving special attention to economic production. How to feed to get a large flow of milk, how to fatten, and how to grow breeding animals will receive proper attention. Prerequisite: Types and Breeds and Principles of Feeding. Textbook: Henry and Morrison, "Feeds and Feeding."

5 class hours a week.

Credits, 5.

Animal Husbandry S-4. (Animal Breeding and Herd-Book Study.) II.

A study of the principles involved in reproduction and improvement of farm animals; the laws of heredity and variation; the various methods of breeding,—inbreeding, line breeding, outcrossing, grading, and crossbreeding; the importance of selection; and a discussion of the needs and possibilities of improvement. Prerequisite: Types and Breeds and Principles of Feeding. Textbook: Babcock & Clausen's "Genetics in Relation to Agriculture."

4 class hours and 1 2-hour laboratory period a week.

Credits, 5.

Animal Husbandry S-5. (Live Stock Management and Stock Judging.) III.

This course consists of laboratory work in the college barns by individual students, with handling of all classes of live stock. The course will consist of five two-hour laboratory periods, three of which will be devoted to the problems of live-stock management, and two to stock judging.

5 2-hour laboratory periods a week.

Credits, 5.

Animal Husbandry S-6. (General Animal Husbandry.) I.

This course consists of a general study of the subject material of animal husbandry; types and market classes of live stock, breeds of farm animals, principles and practice of feeding, live-stock breeding; and management of herds, flocks and studs. Laboratory work is given in live-stock judging and management. As much detail of this broad subject is given as is consistent with time allotted. Textbook: Plumb, "A Study of Farm Animals."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

POULTRY HUSBANDRY

Six courses are offered by this department. One course is a general course designed particularly to equip the student with the fundamental principles underlying successful poultry keeping as related especially to the farm flock. The other five courses are for the student who desires to specialize in poultry culture.

There is a broad field of opportunity for adequately trained men in the commercial handling and sale of poultry and poultry products, specialists in in-



A Class in Egg Packing



Two-Year Course Men Testing Soil

cubation, brooding and rearing, and assistants or managers of commercial poultry farms. Good profits and wages await well-equipped men and women in these and other branches of poultry work.

This department is well equipped to offer practical instruction in poultry husbandry. Our quarters and equipment in Stockbridge Hall provide ample facilities for efficient classroom and laboratory teaching.

Our practical laboratory (college poultry plant) comprises about 1,500 adult birds, divided into some 40 pens of various designs, the flocks ranging in size from 10 to 250 birds; thirty lamp incubators, as well as three mammoth machines; brooding and rearing facilities for 5,000 chicks, including many styles of stove, kerosene and electric brooders; facilities for practice in pen management, fattening, killing, picking, caponizing, judging, mixing rations; construction of poultry houses and appliances, etc.

In addition to the actual practice work performed, the student has an opportunity to keep under observation practical experiments and demonstrations continually under way for the instruction of students and practical poultry keepers.

Poultry

FIRST YEAR

Fall Term
Agronomy S-1 (Soils and Fertilizers)
Animal Husbandry S-1 (Types and Breeds)
Dairy S-1 (General Dairy)
Poultry S-1

Winter Term
Poultry S-2
Microbiology S-1 (Hygiene and Sanitation)
Motors S-2
Business Law S-1

Spring Term
Six months' farm placement training.

SECOND YEAR

Fall Term
Poultry S-3
Veterinary Science S-1 (Poultry Diseases)
Rural Sociology S-1 (Social and Economic Problems)
Construction¹

Winter Term
Poultry S-4
Pomology S-7 (general)
Farm Management S-1 (Farm Management and Accounts)
Agricultural Economics S-1

Spring Term
Poultry S-5
Agronomy S-2 (Crops)
Vegetable Gardening S-6 (general)
Entomology S-1 (Beekeeping)

Courses in Home Economics and Agricultural Opportunities for Women may be had by arrangement.

Poultry S-1. (Judging and Marketing.) I.

Types, breeds, varieties,—their origin and development; poultry judging; utility—for eggs, meat, and constitutional vigor; exhibition—for fancy show-room characteristics by score card and comparison; fattening, killing, dry and scald picking, drawing, shaping, packing, and boning; judging of dressed fowl; market classification of poultry, eggs, and feathers; the requirements of various markets and relative merits of different systems of marketing. Practical exercises will also be provided in all of the above subjects. A trip will be taken to one of the leading Connecticut Valley poultry shows. Opportunity will also be presented each member of the class to fit entries for the Market Poultry Show, held each year as part of the activities of the poultry students of the college.

4 class hours and 2 2-hour laboratory periods a week.

Credits, 6.

Poultry S-2. (Incubation and Brooding.) II.

The principles of incubation, natural and artificial; lamp and mammoth incubators; the production, care and selection of hatching eggs. The principles of brooding and rearing; brooding systems and equipment; management of the colony house and rearing of the chicks. Students will carry through a hatch with the lamp incubators, and will have charge of a colony house of chicks under supervision.

2 class hours and the equivalent of 3 2-hour laboratory periods a week. Credits, 5.

Poultry S-3. (Feeding and Housing.) I.

Principles of feeding; the poultry feeds and compounding of rations. Feeding practices for maintenance and production. Artificial illumination as an aid to winter egg production. Students will have charge of feeding and caring for a pen of laying birds. Poultry houses and fixtures; the principles of design; common types and cost of construction.

4 class hours and 2 2-hour laboratory periods a week.

Credits, 6.

¹ Construction — Rural Engineering S-7 + S-3.

Poultry S-4. (Poultry Breeding.) II.

The principles of breeding and their application to poultry practice work in record keeping, pedigree hatching, stud and flock mating will be required as season permits.

4 class hours and 1 2-hour laboratory period a week.

Credits, 5.

Poultry S-5. (Poultry Farm Organization.) III.

A study of the organization of the poultry farm as a business. The layout of the poultry plant for efficiency. Study of poultry surveys, records, accounts and advertising. One or more poultry trips will be made to representative successful poultry farms.

Practice work with mammoth incubators will be given this term.

4 class hours and the equivalent of 1 2-hour laboratory period a week. Credits, 4.

Poultry S-6. (General Poultry Course.) II.

Poultry keeping as a national industry; its importance and geographical distribution; opportunities and possibilities in poultry culture in Massachusetts; principles of feeding; utility classification of fowl; incubation, both natural and artificial; the production and packing of hatching eggs; the baby chick industry; and brooding and rearing. Practical exercises will be closely correlated with the breeds and varieties, studies of various types and sizes of incubators, brooders, and brooder houses.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

NOTE.—Students who take course 6 must get permission from the Poultry Department to take advanced poultry courses.

DAIRY MANUFACTURES

The course in dairy manufactures is designed to fit men for positions with market milk concerns, creameries, ice-cream factories, and specialized dairy farms. It is limited to 12 students.

The dairy work is given in Flint Laboratory, a modern building designed especially for dairy work and equipped with the newest and best types of dairying machinery.

The pasteurizing room contains a milk clarifier, cooler, and two 200-gallon vat pasteurizers. There is an ample and modern sterilizing outfit and a large and very well-equipped refrigerating plant.

The room designed for cheese making contains double-jacketed vats, cheese mixer, and draining racks, presses, etc. The buttermaking room is well equipped with power and hand churns of various types, scales, and other accessories.

In the starter-making room there is a 50-gallon double-jacketed vat, a 100-gallon vat pasteurizer, a 50-gallon starter can, and other smaller ones.

The separator room has a complete equipment of power and hand separators, milk heater, Babcock tester, sterilizer, etc.

The testing laboratory contains all necessary apparatus, both steam and hand, for Babcock testing, and individual apparatus necessary for each student.

The ice-cream making room contains all such equipment as is found in the modern ice-cream plant.

Dairy Manufactures**Dairy S-1. (General Dairy.) I, II.**

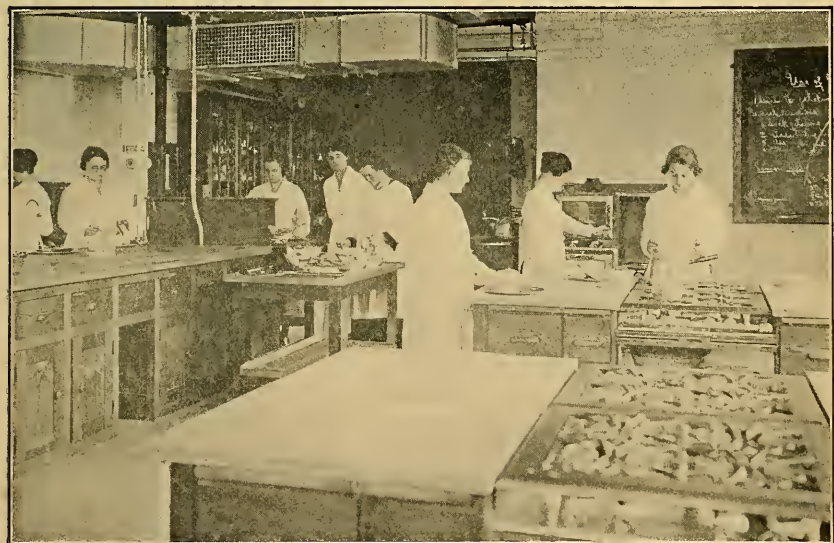
This course takes up the question of the importance of dairying in the United States, and especially in the New England States, giving the development of dairying from the earliest to the present time. It covers the secretion, composition, and properties of milk; reasons for variation in the per cent of fat in different samples of milk; the Babcock test for fat in milk and other dairy products; other common milk tests; the advantage of testing herds, cow test associations, advanced registry work; the handling of market milk; soft cheese making, ice-cream making, and butter making as applied to general farm conditions. The laboratory work consists mainly in testing milk and dairy products for butter fat, solids, and acidity, together with some laboratory work in milk handling, butter making, cheese making and ice-cream making.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.



Making Butter



A Class in Cooking

Dairy S-2. (Milk Products.) I.

This course is mainly on soft cheese and ice-cream making, but includes some lectures on the manufacture of other milk products, such as artificial buttermilk, casein, condensed milk, milk powder, etc. It deals primarily with the up-to-date methods of making ice-cream and various kinds of soft cheese, such as pimento, olive, nut, Neufchatel, cottage, etc., and shows how a product of good quality can be made either as a means of marketing the entire milk supply or utilizing the surplus. Considerable attention is given to different methods of preparation for marketing. The laboratory work consists in the making of ice cream and various forms of soft cheese.

4 class hours and 4 3-hour laboratory periods a week.

Credits, 10.

Dairy S-3. (Market Milk.) II.

This course takes up the history of market milk, its food value and use. Attention is given to the necessary essentials in producing a clean product; the economics of milk production; the advantages of co-operative milk producers' organization; the various methods of marketing milk; clarification; pasteurization; cooling, etc. The laboratory work consists in visiting dairy herds and city milk plants; the operation of machinery used in connection with market milk work.

4 class hours and 4 3-hour laboratory periods a week.

Credits, 10.

Dairy S-4. (Butter Making.) III.

This course covers the various methods of separating milk; the history, selection, care, and use of cream separators; the pasteurization and ripening of cream; testing of acidity in cream; the making and use of starters; a study of churns and churning; up-to-date methods of making butter; marketing butter, and tests for moisture and salt in butter. The laboratory work consists in the actual operation of separators and churns.

4 class hours and 4 3-hour laboratory periods a week.

Credits, 10.

GENERAL HORTICULTURE

The object of this course is to train men for positions as superintendents or foremen in parks or on private estates, or as foremen for landscape gardeners, or for private practice in horticulture service, including so-called tree surgery and city forestry.

Ample classrooms and laboratories with necessary equipment are provided for all work that must necessarily be done indoors. The extensive college campus, with its stretches of lawn, its plantings of trees, shrubs, and vines, its drives and walks, furnishes an outdoor laboratory where the student will be brought into personal relation with problems comparable in every way with those that arise in the management of a park, private estate, etc. Work with various types of horse power, motor power and hand machinery and implements will give him practical knowledge of their use, care, and application. A growing nursery furnishes opportunity for the propagation and culture of those plants used in ornamenting grounds, the transplanting of these about the grounds in compliance with prepared landscape plans, and their subsequent care, including proper methods of pruning.

Horticulture

<i>Fall Term</i>		<i>Winter Term</i>	<i>Spring Term</i>
Agronomy S-1 (Soils and Fertilizers)		Horticulture S-1 (Plant Propagation)	Six months' farm placement training.
Floriculture S-1 (Garden Flowers and Bedding Plants)		Forestry S-1 (Woodlot Management)	
Pomology S-1 (Fruit Varieties)		Construction ¹	
Vegetable Gardening S-1		Business Law S-1	

¹ Construction — Rural Engineering S-7 + S-3.

Fall Term
 Horticulture S-2 (Plant Materials)
 Horticulture S-5 (Construction and Maintenance)
 Floriculture S-6 (Greenhouse Management)
 Agricultural Economics S-1

Winter Term
 Horticulture S-3 (Plant Materials)
 Horticulture S-6 (Construction and Maintenance)
 Horticulture S-8
 Rural Sociology S-1 (Social and Economic Problems)

Spring Term
 Horticulture S-4 (Plant Materials)
 Horticulture S-7 (Construction and Maintenance)
 Floriculture S-5 (Conservatory Plants)
 Motors S-2, or —
 Entomology S-1 (Beekeeping)

Horticulture S-1. (Plant Propagation.) II.

This course sets forth the principal and best methods used in reproducing and increasing the number of those plants cultivated in the various branches of horticulture.

4 class hours and 1 2-hour laboratory period a week.

Credits, 5.

Horticulture S-2. (The Principles of Plane Surveying with some Simple Applications of the same.) I.

Lectures and laboratory exercises on the construction and use of simple surveying instruments used in the making surveys which are to serve as the basis of plans for parks, cemeteries, or private estates and home grounds.

Credits, 5.

Horticulture S-3. (Plant Materials.) II.

The object of this course is to learn to know the trees, shrubs, and vines used in ornamental planting,—their names, their individual characteristics as to foliage, fruit, and dormant twig features, and their habits of growth.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-4. (Plant Materials.) III.

A continuation of Horticulture S-3, giving special attention to foliage and flower characters and flowering habits of the plants. In addition, a study will be made of the evergreens and their uses.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-5. (Construction and Maintenance.) I.

Particular stress will be given to fall pruning of shrubs, together with their preparation for winter, also fall transplanting of shrubs. In addition, instruction will be given in elementary tree surgery and in walk and road maintenance.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-6. (Construction and Maintenance.) II.

In this term cost analyses and various park systems of maintenance will be discussed, together with park appliances, also winter pruning, snow removal, and winter protection of shrubs.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-7. (Construction and Maintenance.) III.

Especial attention will be given to spring pruning, lawn mowing, and lawn construction and maintenance. Tree surgery, walk and road construction and maintenance, together with weed eradication, will be studied.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Horticulture S-8. (Continuation of Horticulture S-2.) II.

Credits, 5.

POMOLOGY

The courses in fruit growing have been arranged with a view to training the student for work on a farm on which the growing of fruit is the leading branch of farming. As will be seen, he gets a fair training in many other lines of farm work, but the emphasis is on fruit.

It is hoped that students who have completed this work, and who have supplemented it with a sufficient amount of practical experience on the farm, will be fitted to take up fruit farming for themselves, or to manage fruit farms or fruit departments for others.

In all of this fruit work the emphasis is on the practical side, with only enough of the science and theory involved to make the student a more efficient man or woman. If the question under consideration is the healing of wounds made in pruning fruit trees, the student is given a brief discussion of the scientific principles involved, and is then taken into the orchard and required to do pruning in such a way that the wounds made will heal most satisfactorily. If it is a question of how to prune a grapevine to insure the maximum crop, the method of bearing in the grape and the various systems of pruning are discussed in the classroom, and the student is then taken into the vineyard and studies the vine to see where it bore last year, and then prunes it under expert supervision.

The Department of Pomology has 50 acres of orchard of various ages and methods of arrangement, including all the principal fruits; 5 acres of vineyards in which are shown the principal types of trellis and the leading methods of training grapes; several acres of small fruits; and a good equipment of orchard and nursery tools of all the principal types, enabling students to learn the value of each type. For orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided.

Pomology

FIRST YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agronomy S-1 (Soils and Fertilizers)	Pomology S-2 (Orchard Production)	Six months' farm placement training.
Floriculture S-1 (Garden Flowers and Bedding Plants)	Horticulture S-1 (Plant Propagation)	
Pomology S-1 (Fruit Varieties)	Construction ¹	
Vegetable Gardening S-1	Business Law S-1	

SECOND YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Pomology S-3 (Harvesting and Marketing)	Pomology S-4 (Orchard and Vineyard Pruning)	Pomology S-5 (Spraying)
Animal Husbandry S-6 (general)	Poultry S-6 (general)	Pomology S-6 (Orchard Management)
Horticultural Manufactures S-1	Dairy S-1 (general)	Agronomy S-2 (Crops)
Agricultural Economics S-1	Rural Sociology S-1 (Social and Economic Problems)	Motors S-2, or —
		Entomology S-1 (Beekeeping), or —
		Horticultural Manufactures S-2

Pomology S-1. (Fruit Varieties.) I.

This introductory course of the work in fruit growing will consist of a thorough study of the principal varieties of the different fruits.

One of the most prolific causes of failure in the fruit business is the growing of wrong varieties; varieties requiring a dry soil are set in a wet soil; tender varieties are set in a wet soil or where only hardy ones should be used; quality, productiveness, and season of ripening are ignored; and varieties are set which might be excellent in Ohio or Virginia or Missouri, but which cannot be grown profitably in Massachusetts.

This course aims to lay the foundation for a better state of things, and the student will be given a thorough drill on the leading varieties of the different fruits and will have an opportunity to test personally many of the leading varieties, especially of apples.

5 class hours a week.

Credits, 5.

Pomology S-2. (Orchard Production.) II.

This course deals with questions concerning the establishing and maintaining of fruit plantations.

It will include a full discussion of the choice of a site for the plantation. Many an orchard has failed simply because it was put in the wrong place. On another site on the same farm it might have been a conspicuous success.

The soil preferences of varieties of fruits will be considered, so that the student may avoid setting Rhode Island greenings where Baldwins should be grown, or Spies where Hubbardstons should stand.

¹ Construction — Rural Engineering S-7 + S-4.

The culture of fruit plantations will be considered, and the comparative value of sod and cultivation presented. Each system has its advantages and disadvantages. What are they, and under what conditions should each system be used?

Orchard implements will be discussed, examined, and tested, in order that the student may see for himself their good and bad points.

The question of cropping orchards will be discussed,—whether it is best to grow corn and beans and potatoes in the orchard, or to allow the trees to use all the land.

5 class hours a week.

Credits, 5.

Pomology S-3. (Harvesting, Marketing.) I.

This course will deal with the picking, packing, storing, and marketing of fruits. More men fail on these points than anywhere else in the fruit-growing business. There is a vast difference between good and bad cultivation or fertilizing of fruit plantations, but there is still more between good and bad picking or packing. The student in this course will have actual practice, so far as is possible, in the harvesting of all the fruits available in the college plantations. He will put these same fruits in storage, and will later grade them and put them up for market. At the same time, he will receive lectures on all phases of the subjects under consideration.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Pomology S-4. (Orchard and Vineyard Pruning.) II.

More fruit plantations are damaged by unintelligent pruning than by mismanagement in any other single operation. If the orchardist does not know that apple trees bear in spurs, he is very liable to cut these off in pruning, and so reduce his chances of a crop. If he is ignorant of the fact that the peach bears on last year's wood, he may remove most of this wood, and incidentally most of his crop. This course aims to give the student a thorough training in the theory of pruning and the methods of bearing of the different fruits.

At the same time, every student is required to do the work of pruning in the college orchards and vineyards until he becomes reasonably proficient with each kind of fruit.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Pomology S-5. (Spraying.) III.

In this course a careful study is made of modern methods of spraying. All the principal spray materials are studied, and the student is given practice in their preparation for use and in applying them to the orchard.

The department is well equipped with modern spraying apparatus, from bucket pumps to large power outfits, and students are required to study the construction of these pumps, and to operate them in the orchards.

Spraying is very properly regarded as one of the most important operations in connection with growing fruit, and it is the aim of this course to train students to recognize the work of our common orchard pests, to prepare the proper materials for their control, and to apply these efficiently.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Pomology S-6. (Orchard Management.) III.

The work in orchard management includes a detailed study of such questions as the planning and laying out of fruit plantations so that they may be handled most economically; the cost of various operations, and methods of reducing expenses; efficient handling of labor on fruit farms; the use of labor-saving devices in fruit work; the most economical units in fruit production.

While orcharding will always be the leading phase of the fruit business in Massachusetts, there are many unusual opportunities for success in growing the various small fruits. This course will deal with the problems of establishing and handling successfully plantations of strawberries, raspberries, blackberries, currants, gooseberries, and grapes, including such questions as the choice of varieties; the best types of soils; laying off and setting the plantation; the proper fertilizing; methods of pruning and training. The college has

large plantations of most of these fruits, so that the student will have ample opportunity for all types of practical work. Everything possible will be done to make the course of the utmost practical value, as well as to give the scientific principles on which our practices are based.

4 class hours and 1 2-hour laboratory period a week.

Credits, 5.

Pomology S-7. (General Course.) II.

This course is intended to meet the needs of students in the Animal Husbandry and Poultry majors who cannot devote more than one term to the subject of Pomology. The course deals with the practical side of the growing and marketing of fruits. Especial attention is given to such questions as selection of site for the plantation, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing.

3 lectures and 2 2-hour laboratory periods a week.

Credits, 5.

FLORICULTURE

Students who complete the course in floriculture are fitted primarily for work in commercial greenhouse establishments and retail flower stores. After gaining experience, such students may be able to start in business for themselves. Those who elect the courses in general horticulture, also, should be qualified for positions on private estates, in parks, or in nurseries.

The offices and classrooms of the Department of Floriculture are located in French Hall. Of the two lecture rooms, one will accommodate 40 students, the other 90 students; a laboratory, equipped with slate-covered tables, will accommodate 40 students. In the basement of the building the department has a specially prepared room for bulb storage, a fertilizer and tool room, and a large room for general storage purposes.

The glass area of the department consists of approximately 20,000 square feet, divided as follows: French Hall, range of 7,200 square feet, a durable practical commercial range, composed of palm and fern, violet, carnation, rose, and students' houses; the old Durfee range of 7,400 square feet, devoting to the growing of decorative, conservatory, and bedding plants and chrysanthemums; one house of 3,200 square feet, suitable for propagating work and general plant culture; and approximately 2,200 square feet in cold frames and hotbeds.

In addition, the department has 2 acres of land used for the summer culture of carnations, violets, gladioli, dahlias, sweet peas, bedding plants, etc. This includes a garden of about 4,700 square feet, devoted to the culture of annuals. A large collection of biennials and herbaceous perennials is maintained, and is being enlarged from year to year.

Floriculture

FIRST YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agronomy S-1 (Soils and Fertilizers)	Floriculture S-2 (Greenhouse Construction and Management)	Six months' farm placement training.
Floriculture S-1 (Garden Flowers and Bedding Plants)	Horticulture S-1 (Plant Propagation)	
Pomology S-1 (Fruit Varieties)	Construction ¹	
Vegetable Gardening S-1	Business Law S-1	

SECOND YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Floriculture S-3 (Commercial Floriculture)	Floriculture S-4 (Commercial Floriculture)	Floriculture S-5 (Conservatory Plants)
Horticulture S-2 (Plant Materials)	Horticulture S-3 (Plant Materials)	Horticulture S-4 (Plant Materials)
Horticulture S-5 (Construction and Maintenance)	Rural Sociology S-1 (Social and Economic Problems)	Motors S-2
Agricultural Economics S-1	Horticulture S-6 (Construction and Maintenance)	Horticulture S-7 (Construction and Maintenance)

Floriculture S-1. (Garden Flowers and Bedding Plants.) I.

This course is intended for students who will take up private estate work or who will specialize in floriculture. It will include a study of the annuals,

¹ Construction — Rural Engineering S-7 + S-4.

biennials, herbaceous perennials, and bedding plants which are commonly used in commercial floriculture and in private estate work. Methods of propagation, culture, and uses will be considered. Laboratory exercises will include work in propagation, planting, study of materials, and planning of beds and borders.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-2. Greenhouse Construction, Heating, and Management.) II.

This course will take up the origin, growth, and importance of the floriculture industry; development of the greenhouse; types of houses and construction; methods of greenhouse heating; general principles of greenhouse management, including soils and their preparation, fertilizers, watering, ventilation, and fumigation; methods of propagation for plants grown under glass. Textbook: White's "Principles of Floriculture."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-3. (Commercial Floriculture.) I.

Courses S-3 and S-4 will be devoted primarily to a consideration of the important commercial crops. Special attention will be given to the culture (under glass) of roses, carnations, chrysanthemums, violets, and sweet peas. Other cut-flower crops and various potted plants will also be considered. Textbooks required during the two courses will be: Holmes, "Commercial Rose Culture;" Dick, "Commercial Carnation Culture;" Smith, "Chrysanthemum Manual."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-4. (Commercial Floriculture.) II.

A continuation of Floriculture S-3. In addition, a part of the course will be devoted to floral arrangement, including the general principles underlying the use of flowers in funeral designs and sprays, table decorations, corsages, vase, and basket arrangements.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-5. (Conservatory Plants.) III.

A study of the plants, both foliage and flowering, which are used in conservatories and in decorative work. Methods of propagation, culture, uses, and identification of plants will be included in the work.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Floriculture S-6. (Greenhouse Management.) I and III.

A course of general nature intended for those who have not taken the other courses in floriculture. Students who have taken the other courses will not be allowed to register in this course. It will include a brief description of greenhouse construction and heating; general principles of greenhouse management, including soils and their preparation, fertilizers, watering, ventilation, and fumigation; methods of propagation for plants grown under glass; outlines of cultural methods for important greenhouse crops. Textbook: White's "Principles of Floriculture."

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

VEGETABLE GARDENING

The business of vegetable growing is one of the leading types of agriculture in Massachusetts. Middlesex County is surpassed in the value of vegetables grown for sale by only four other counties in the United States. The value of vegetables grown for home use in Massachusetts is more per farm than in any other State in this country. The vegetable greenhouse district around Boston is one of the largest in the United States, and the only district growing head lettuce under glass. The Massachusetts markets for vegetables are considered by many to be among the best, for we are further removed from the large vegetable trucking sections than other large centers of population, while our markets demand high-quality vegetables.

This course is fitting men who wish to go into business for themselves to become market gardeners, truck farmers, and greenhouse vegetable growers. For those whose principal interest may be other types of agriculture the course



Fertilizer Mixing



Tractors at Work

has much to offer along the lines of special crops often spoken of as cash crops. For those who wish to work for some one else this course offers training such that its graduates are being placed in responsible positions with commercial vegetable growers, seed growers, and private estates.

Vegetable Gardening

FIRST YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Agronomy S-1 (Soils and Fertilizers)	Horticulture S-1 (Plant Propagation)	Six months' farm placement training.
Floriculture S-1 (Garden Flowers and Bedding Plants)	Construction ¹	
Pomology S-1 (Fruit Varieties)	Business Law S-1	
Vegetable Gardening S-1	Pomology S-2	

SECOND YEAR

<i>Fall Term</i>	<i>Winter Term</i>	<i>Spring Term</i>
Vegetable Gardening S-3	Vegetable Gardening S-4	Vegetable Gardening S-7
Pomology S-3 (Harvesting and Marketing)	Pomology S-4 (Orchard and Vineyard Pruning)	Pomology S-5, or —
Agricultural Economics S-1	Poultry S-6 (general)	Pomology S-6
Horticultural Manufactures S-1	Rural Sociology S-1 (Social and Economic Problems)	Motors S-2
		Horticultural Manufactures S-2, or —
		Entomology S-1 (Beekeeping)

The business of vegetable gardening may be entered with a limited outlay of capital, for the returns on the capital invested are quickly secured, as some vegetable crops mature in a very few weeks, which enables one to turn over his capital from one to three times per season. The nature of this business is such that one locates as near the market as possible, and because of the growth of our cities, vegetable growers, as a group, have profited much by an increase in land values.

The Vegetable Gardening Department has 10 acres of land, 3,500 square feet of greenhouse space, and 500 linear feet of hotbeds and cold frames. These are used to give the student thorough practical training in the fundamentals of vegetable growing, plant production, and vegetable forcing. The office, classroom and laboratory are located in French Hall.

Vegetable Gardening S-1. (Garden Farming.) I.

Students will find this course one which will fit them to carry on estate work, to make the best use of the farm home garden, or to go on with commercial vegetable growing. This is a well-rounded course, studying vegetables from the standpoint of types. The student will work with the leading types of the common vegetables, learning their requirements. Special attention will be given to the harvesting and storage of crops for winter and fall preparation of the land.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-2. (Commercial Vegetable Gardening.) II.

"As a prospective commercial vegetable grower and a producer of food, what must I know of the value of vegetables as a food, their history, present extent of this business and the outlook for the future?" These facts are studied as well as many of the fundamentals of vegetable production. Practical work will consist of vegetable seed study, seed germination, and production of vegetable plants under glass. Special care will be given to acquaint the student with the importance of detail, so that he will be able to make the best of the six months' training with some of the leading vegetable growers of this State.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-3. (Types and Varieties.) I.

Success or failure in vegetable production depends upon the proper selection of types and varieties. Market demands differ in different sections, and there is a difference in the types produced from various seed sources. This department maintains a variety garden, growing some 250 or more varieties of vegetables, so as to train the student in the proper selection of types and

¹ Construction — Rural Engineering S-7 + S-4.

varieties. Study is given to the source and desirability of good seed. The importance of high quality and good appearance of vegetables is kept before the student so that he will be fitted to better judge and exhibit vegetables.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-4. (Vegetable Forcing.) II.

The demand is increasing for fresh vegetables out of season, and Massachusetts markets are among the best for these types of vegetables. There are many large greenhouse plants in the State, and this course meets a real demand by giving the student training in the production of vegetables out of season. There is a demand for the men with this training. The student will try out the latest and best methods of caring for greenhouse crops.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-6. (Vegetable Crops for the General Farm.) III.

Many of the vegetable crops are of such a nature that they can be successfully grown as a side line to other types of farming. Special emphasis will be given to those crops which the men interested in animal husbandry can use for a money crop or for stock-feeding purposes. The farm home garden is important for any farm, and here in this State the yield from such gardens is greater than in other States. As the area on the general farm devoted to vegetables is one of the most productive in money value, this course will show the student how to make the best use of this farm home garden.

3 class hours, 2 2-hour laboratory periods a week.

Credits, 5.

Vegetable Gardening S-7. (Problems in Commercial Vegetable Gardening.) III.

In order to understand the best methods of growing vegetables on a commercial scale the student must be acquainted with the principles underlying these practices.

Weekly assignments dealing with specific problems as encountered in the actual business of growing vegetables commercially are worked out by the students. Such problems as weather and market reports, the purchase of seeds, fertilizers and equipment, spring preparation of the soil, the study of various forms of machinery used by the market gardener, the identification of and methods of control of obnoxious weeds, injurious insects and diseases, are included in the course. Organized trips to market garden sections of the Connecticut Valley and the vicinity of Boston are part requirements of this course.

1 2-hour class period per week, 4 1-hour outside laboratory periods per week.

Credits, 5.

GENERAL COURSES FOR WOMEN

There was offered in the fall of 1922, for the first time, a general course for those young women who do not want to specialize in any one branch of agriculture, but who do want preparation for rural life. This course includes such agricultural and home economic courses as the country girl would be most likely to use, both for profit and for pleasure. This course should appeal to many young women whose home is on a farm or in a small town; or those who hope some time to live in the country.

General Course for Women

FIRST YEAR

Fall Term

Agronomy S-1
Floriculture S-1
Rural Sociology S-1
Home Economics S-1
Agricultural Opportunities
for Women S-1

Winter Term

Horticulture S-1
Business Law S-1
Home Economics S-2
Microbiology S-1 (Sanitation
and Hygiene)

Spring Term

Six months' farm placement,
training.

Fall Term
 Agricultural Economics S-1
 Animal Husbandry S-6 (general)
 Home Economics S-3 or S-4
 Horticultural Manufactures S-1

Winter Term
 Poultry S-6 (general)
 Pomology S-7 (general)
 Home Economics S-5
 Dairy S-1 (general)

Spring Term
 Horticultural Manufactures S-2
 Vegetable Gardening S-6 (general)
 Home Economics S-6
 Entomology S-1, or —
 Floriculture S-6, or —
 Poultry S-5

RELATED SUBJECTS IN OTHER DEPARTMENTS

Agricultural Opportunities for Women S-1. I.

Agriculture is a field in which women are finding increasingly good opportunities.

The particular problems which the women engaged in farming will have to meet, and the special lines of farming in which they will have favorable opportunities, will be considered in a series of conferences.

2 class hours a week.

Credits, 2.

Home Economics Department.

Agronomy S-1. (Soils and Fertilizers.) I.

In this course will be studied the origin and formation of soils; classes and types of soils; the control of soil moisture; tillage operations; organic matter, its importance and maintenance; acid soils and liming; commercial fertilizers. Considerable time will be devoted to actual work with fertilizing materials, and the student will be expected to become thoroughly familiar with farm manures, forms of agricultural lime, and commercial fertilizers—their composition, properties, care, and use.

3 class hours, and 2 3-hour laboratory periods a week.

Credits, 5.

Agronomy Department.

Agronomy S-2. (Crops.) III.

A course covering the production of field crops and including a study of their adaptation to soils and climate; varieties and the selection of seed; the preparation of the soil; fertilization, planting, cultivation, care, harvesting, and use of field crops. Special attention will be given the establishment and improvement of mowings and pastures in Massachusetts. Corn, oats, rye, barley, buckwheat, grasses, clovers, vetches, beans, peas, potatoes, and root crops will be studied. Actual practice with growing crops in the field and greenhouse, and with prepared specimens in the laboratory, including the judging of corn and potatoes, will be given.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Agronomy Department.

Agricultural Economics S-1. (Marketing.) I, II.

The purpose of this course is to present the business side or economics of agriculture. It is based upon the principle that products are made to sell, that the real object is to produce large money returns. The goal is the largest possible net profits with a given amount of land, labor, money, and equipment. The course deals with the possible types of profitable commercial agriculture in New England; the present location of the most profitable farming sections, the choice of a farm; the necessary investment, and the proportion to invest, in land, in improvements, in stock and equipment, and in reserves for labor and supplies on different kinds of farms.

Another section of the course treats of the principles of farm credit. Who should borrow, sources of credit, mortgage credit, farm loan associations, land banks, personal credit, national bank loans, credit unions, terms of credit, and how to use credit profitably, are some of the topics studied.

Another division of the subject is marketing farm products. This will be treated in a very practical manner. The following are some of the topics: marketing as a part of production; outlets of the sale of farm products; principles of marketing; description of wholesale methods of distribution; middlemen, functions, and abuses; methods of sale, prices of farm products; price quotations; government aid in marketing; direct marketing; co-operative buy-

ing and selling; methods of successful co-operation; farmers' exchanges in Massachusetts; how to organize successfully.

Each student will be required to select some principal product in which he is interested, and make a careful study of its production, handling, and marketing on a profitable commercial scale. This course is given by the Department of Agricultural Economics. Lectures, textbook, original study, and report.

5 class hours a week.

Credits, 5.

Department of Agricultural Economics.

Business Law S-1. II.

The work of this course will cover such points as land, titles, public roads, rights incident to ownership of live stock, contracts, commercial paper, and distinctions between personal and real property. Text, written exercises, lectures, and class discussions.

5 class hours a week.

Credits, 5.

Entomology S-1. (Beekeeping.) III.

This course comprises a general consideration of the biology of the honey bee and the elements of practical beekeeping. Some topics covered are: life history, general behavior and instincts, structure, products, relations of bees to plants, the honey flora. The course aims particularly to afford first-hand practical experience with bees, to the end of enabling their proper maintenance for any purpose,—horticultural, educational, or apicultural. Bee diseases, a thorough understanding of which is fundamental, are emphasized. So far as possible, the work is made individual in constructing materials and apparatus and in the manipulation of bees.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Entomology Department.

Farm Management S-1. (Farm Management and Accounts.) II.

A study of farming as a business; the correlation and adaptation of different farm enterprises, as dairy, orchard, poultry, to the specific farm; land, labor, and capital requirements; farm and building, plans and arrangements; the choice and purchase of a farm. Several laboratory periods will be devoted to practice in farm accounting. Farm experience is a prerequisite to this course.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Department of Farm Management.

Forestry S-1. (Woodlot Management.) II.

A course in tending, harvesting, marketing, and renewing the forest crop, with particular reference to the problems of the farm woodlot. The instruction is mainly practical, and is conducted in the field, with a minimum of bookwork; but there is a constant emphasis upon the development of keen and imaginative observation, and the acquisition of the conservationist point of view. Opportunities for field work are varied and extensive. There are woodlots of several types on or near the campus, and students have the fullest use of the Mt. Toby Demonstration Forest, a 750-acre tract 7 miles distant, belonging to the college and managed by the Forestry Department.

2 class hours and 1 4-hour and 1 2-hour field periods a week.

Credits, 5.

Forestry Department.

Home Economics S-1. (Clothing.) I.

An important problem in the home today is the selection of fabrics; therefore their character, cost, and durability are studied with reference to planning a wardrobe for a limited income.

Consideration will also be given to the principles of design, appropriateness, and simplicity in dress to develop good taste.

There will be practical work in sewing and making garments.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Home Economics Department.

Home Economics S-2. (Foods.) II.

Every woman concerned with the welfare of the family is interested in the problem of nutrition. To select food wisely, and to prepare it is that the greatest amount of nutrition may be saved, is of the utmost importance.

Special study will be made of the needs of the body and the selection of foods to supply those needs; also care in the handling and keeping of foods, and planning meals for efficiency and economy.

Balanced menus are not vague and mysterious, but result from the application of a few fundamental principles. Many people are underfed, not from a lack of food, but from an unwise choice.

This course will include laboratory work of practical value.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Home Economics Department.

Home Economics S-3. (Clothing.) I.

A continuation of course S-1, which is a prerequisite for this course.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Home Economics Department.

Home Economics S-4. (Goods.) I.

A continuation of course S-2, with special emphasis upon the planning and serving of the meals. Consideration will also be given to special problems of nutrition.

Course S-2 is a prerequisite for this course.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Home Economics Department.

Home Economics S-5. (Home Management.) II.

There are many efficient methods successfully used in the business world which can be applied in the business of home-making.

Since the home-maker is largely responsible for all expenditures connected with the house, an important consideration in this course is the study of the family budget, the apportionment of the income, and the keeping of accounts.

Equally important is the standardization of household tasks, the study of systematic methods of work, selection and care of equipment, and the use of time and labor saving devices.

5 class hours a week.

Credits, 5.

Home Economics Department.

Home Economics S-6. (Home Nursing.) III.

It should be far easier to keep well than to become sick, provided one understands the fundamental principles of hygiene, thus insuring the care of the family health.

However, every home-maker needs some knowledge of home care of the sick, including the study of simple diseases and their prevention, the care of young children and invalids, and first aid to the injured.

5 class hours a week.

Credits, 5.

Home Economics Department.

Horticultural Manufactures S-1. I.

The utilization of culls and low grades of fruits and vegetables is becoming a more important problem each year. Producers should be able to market their whole crop at a profit. The general problems studied in this course will be: the manufacture of apple products from cull apples; the canning of all fruits and vegetables available at this season, together with the manufacture of their various products, such as jams, jellies, conserves, pickles, etc.

Students will be required to keep accurate costs of materials in all canning and manufacturing operations, together with a record of methods used.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Department of Horticultural Manufactures.

Horticultural Manufactures S-2. III.

This is a continuation of Course S-1. The preservation of small fruits, together with the manufacture of their products, the evaporation of fruits and vegetables, the manufacture of maple products, and the canning of spring vegetables are the principal subjects studied. Prerequisite: Horticultural Manufactures S-1.

2 class hours and 3 2-hour laboratory periods a week.

Credits, 5.

Department of Horticultural Manufactures.

Microbiology S-1. (Hygiene and Sanitation.) II.

Deviation from health, from the normal being, is disease. The human body is susceptible to deviation from health. Certain elements are responsible for the entrance of disease into the body. The body becomes weakened through exposure, lack of exercise, unsuitable food, abuses. Under such circumstances it lays itself open to attack. There is the attack from within, which consists of some organic derangement, and the attack from without, which makes it possible for foreign enemies, agents, or micro-organisms to enter.

Closely associated with the production of disease are intermediaries and casual factors, as ventilation, water-supplies, sewage disposal, and food. They serve as vehicles for disease agents. The germs of disease find their way through them, and are carried by them. Besides, human contact seems to be the most important disseminator, and insects and animals may harbor or convey, and in some instances instigate, disease.

Then there are those conditions which react on the body in a physical manner and influence its mechanism and its operating facilities, as mental disturbances, character of food, conditions of living.

It is the purpose of this course to discuss the nature of diseases, what causes them, the significance of sanitation and hygiene in preventing them, and the methods of control; in other words, to study, in the light of present knowledge, how to preserve health and prevent deviation from health.

5 class hours a week.

Credits, 5.

Microbiology Department.

Microbiology S-2. (Dairy Bacteriology.) I.

Bacteria and other micro-organisms are the responsible agents for the changes which occur in milk and for the contagion which sometimes causes diseases. They are found in milk at times when leaving the udder, they get in with the dust and dirt while milking, and they adhere to the dairy utensils, which carry them over from one milking to the next. From the cow to the consumer there is the constant presence of these micro-organisms to contend with, on the one hand, and to foster, on the other. All steps taken are significant in their control. The milking process, the handling of the cow, the condition of the milker, the cleansing of utensils, the management of the stable, the feeding, straining, aeration, cooling, clarifying, pasteurizing,—all are steps in the control of micro-organisms.

Many kinds of changes take place in milk, due to different kinds of micro-organisms. Many of these changes are sought, as the ripening of cream for butter, of milk for cheese, of milk for milk drinks; and many of these changes, also, are fought against, as ropy milk, sour milk, bitter milk, tainted milk, etc.

Micro-organisms of typhoid fever, scarlet fever, diphtheria, and others not infrequently find their way through the milk to the consumer, and produce epidemic forms of these diseases.

It is evident, therefore, that to handle milk and milk products safely it is desirable to know something of the agents which are the source of so much attention in the dairy. This indicates the nature of the substance of this course. This course is required of all students who elect dairying as one of their special lines of work.

5 2-hour laboratory periods a week.

Credits, 5.

Microbiology Department.

Rural Engineering S-1. (Farm Engineering.) I.

This course is intended to familiarize the student with the various types of farm implements, to teach him their operation and care, and give practice in the adjustment and repair of the mechanical equipment on the farm.

The various types of field implements are studied, and emphasis is laid on the selection of implements suited to New England conditions. The adjustment of machines is discussed and the student is given practice in setting machines for different field conditions.

Part of the course is given over to the repair of farm equipment. In this work part of the time is given over to blacksmithing and the balance to such exercises as soldering, babbitting and fitting bearings, lining up shafting, pipe

fitting, threading bolts and nuts, and practice in tying knots and splicing rope. Farm implements are brought in and overhauled to give practical work in this line. In the limited time available it is not expected to make a blacksmith or mechanic out of the student, but it is hoped that the student will learn to know the tools used and get sufficient practice in their use so that he can make repairs on his own equipment.

Part of the course is given over to the study of water supply systems, including pumps, rams, and complete power systems. Farm-lighting plants are also studied, attention being given to selection, as well as care and operation. The principles underlying the practice of farm drainage are discussed, and practice is given in the use of simple leveling instruments for the purpose of accurately grading tile drainage ditches.

2 lectures and 3 2-hour laboratory periods a week.

Credits, 5.

Rural Engineering Department.

Rural Engineering S-2. (Farm Motors.) I, III.

This course deals with the gasoline engine as used for stationary work, automobiles, and tractors. Instruction is given by means of lectures and textbooks, and by operating and repairing stationary engines, automobiles, and tractors. Special attention is given to overhauling and repairing.

3 class hours and 2 2-hour laboratory periods a week.

Credits, 5.

Department of Rural Engineering.

Rural Engineering S-3. (Carpentry.) I, II.

This course gives practice in the care and use of carpenters' tools through bench work, repair of farm equipment, and building construction. Small buildings are erected by the students to give practice in all the phases of house construction. Practice is given in the building of forms and in the mixing and placing of concrete. (Must be taken with Rural Engineering S-7.)

2 2-hour laboratory periods a week.

Credits, 2.

Department of Rural Engineering.

Rural Engineering S-4. (Repair of Farm Equipment.) II.

The object of this course is to give practice in the handling of tools, which will help in the repair of farm machines and miscellaneous farm equipment. Practice is given in forging, including drawing and shaping iron and steel, welding and tempering edge tools, and general blacksmith's repairing. Exercises also include pipe fitting, soldering, splicing rope, belt lacing, and babbiting and adjusting bearings. Practice is given in the use of machinist's tools, such as cold chisel, file, taps and dies, drill press, and lathe. (Must be taken with Rural Engineering S-7.)

2 2-hour laboratory periods a week.

Credits, 2.

Department of Rural Engineering.

Rural Engineering S-5. (Dairy Mechanics.) III.

This course is planned for men who are fitting themselves to take charge of dairy plants or allied lines of work. A study of steam boilers, steam engines, steam turbines, pumps, steam traps, line shafts, belting, electric motors, milking machines, and refrigeration plants.

3 class hours and 1 4-hour laboratory period a week.

Credits, 5.

Department of Rural Engineering.

Rural Engineering S-7. (Farm Structures.) I, II.

A study of the building materials commonly used in farm construction; details of construction and simple structural mechanics; the principle of design of such farm buildings as the dairy stable, hog house, horse barn, general purpose farm, fruit and vegetable storage buildings, etc.

In the drafting room practice will be given in the use of drawing instruments, and instruction given in the fundamentals of mechanical drawing. Each student will have opportunity to design in complete detail one of the major

farm buildings in which he is particularly interested. (Must be taken with Rural Engineering S-3 or S-4.)

1 class hour and 2 2-hour laboratory periods a week.

Credits, 3.

Department of Rural Engineering.

Rural Sociology S-1. (Social and Economic Problems.) 1, II.

The purpose of this course is to acquaint the students with present-day problems of economics, sociology, and politics. The first part of the course will deal with general problems. During the second part a study will be made of the social, economic, and political aspects of rural community life, readings, discussions, and written reports.

5 class hours a week.

Credits, 5.

Department of Rural Sociology.

Veterinary Science S-1. (Poultry Diseases.) I.

This course is planned for students specializing in poultry work. Anatomy and physiology of the domestic fowl are briefly considered, and particular attention is devoted to the diseases which may cause heavy losses in the flock. Prevention rather than cure is emphasized.

5 class hours a week.

Credits, 5.

Department of Veterinary Science.

Veterinary Science S-2. (Animal Diseases.) III.

This course acquaints the student with the more common diseases to which domesticated animals are susceptible. Particular attention is given to conditions favoring diseases, to communicable diseases, and to prophylactic measures, in order that the student may be able to reduce the prevalence of diseases among animals in his charge.

5 class hours a week.

Credits, 5.

Department of Veterinary Science.

SHORT COURSES AT THE MASSACHUSETTS AGRICULTURAL COLLEGE

Short Courses are based on the idea that the motive which inspires study is the most significant factor in study itself, and that this motive rises when the student himself realizes he faces a problem that calls for a solution. Therefore, there is no age limit. Enrolled in short courses are found the young and the old, the experienced and the inexperienced, the theoretical and the practical. In this grouping there is a value, since students learn from each other as well as from the instructors. Practically all Short Course students intend to make a direct application of the knowledge given. Hence the aim of Short Course work is to offer the largest amount of information and training in agricultural and horticultural lines in the shortest possible time. During the past twenty years Short Courses have served hundreds of students in this Commonwealth, and the demand for these courses in recent years has been even greater than in the past.

A ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY

J. C. GRAHAM, LUTHER BANTA, W. A. SANCTUARY, *Staff.*

The One-Year Vocational Poultry Course is designed to meet the needs of those who wish to specialize in this branch of agriculture, but who can spend only one year at the college. The course is vocational in its nature, the plan of which is to "learn to do by doing."

During the winter term the students take Course 1, Elementary Poultry Keeping, and elect about fifteen credits from other subjects listed in Course 6. From the close of the Winter School, about March 10, until college closes,

the latter part of June, they devote all of their time to poultry work. During the summer vacation students have an opportunity to secure additional practical experience on general or specialized farms. With the opening of college in the fall, students again devote all of their time to poultry work, finishing the course at the end of the fall term, the latter part of December. As the busy season with poultrymen begins soon after the first of the year, the students, by finishing the course before the holiday season, are ready to accept attractive positions or enter business for themselves.

Course of Study

Course 1. Elementary Poultry Keeping. A textbook course supplemented with lectures, recitations, etc., covering the entire field of elementary poultry keeping, special emphasis being laid upon the following subjects: opportunities in poultry keeping, poultry house construction, feeds and feeding, breeds and breeding, incubation, brooding, growing stock, marketing, and poultry diseases. Five recitations per week throughout the year.

Course 2. A practical laboratory course covering the following subjects: carpentry, fattening, killing, picking, dressing, caponizing, avian anatomy and physiology, making and applying disinfectants and lice powder, also identification and study of poultry feeds, etc. Two laboratory periods per week from October until December, inclusive.

Course 3. Poultry Judging. Fall term. A study of the "Standard" and economic classification of poultry, including score card and comparative judging of exhibition and utility poultry for egg and meat characters. Selecting hens for high and low production (or culling) will receive special emphasis in this course. "The American Standard of Perfection" will be used for a text. Two two-hour laboratory periods per week.

Course 4. A practical laboratory course in incubation, brooding, and growing stock. Students receive practice in operating small and mammoth incubators as well as kerosene and coal stove brooders. Some time is devoted to natural incubation and brooding. Equivalent to five laboratory periods per week from March to June, inclusive.

Course 5. A conference, observation, and general reading course, equivalent to one or two recitations per week during the spring and fall terms. In this course the student will become thoroughly acquainted with the best literature on poultry subjects through books, station bulletins, scientific articles, poultry magazines, etc. A thorough discussion of the problems met by the practical poultryman is a strong feature of this course.

Course 6. Supplementary Courses. Each student shall select from the winter short course enough of the following subjects to give him at least 12 to 18 credit hours: pomology, soils, agronomy, rural engineering, beekeeping, market gardening, animal husbandry, farm management, dairying, etc.

Course 7. Poultry Management. A general poultry practice course in the care and management of poultry, the work to be done morning, noon, and night, and other periods as necessity requires, the class to be responsible for the work in caring for specified flocks, under the supervision of instructors, from March until college closes, and from October until December, inclusive. Equivalent to six two-hour periods per week.

Entrance Requirements

Applicants must be at least eighteen years of age and have a good elementary education.

Fees

There is no tuition for residents of Massachusetts, but a laboratory fee of \$5 is required for the fall term and the same for the spring term.

THE SUMMER SCHOOL

The college has maintained a Summer School for the past fifteen years. The Summer Course is intended for high school teachers, teachers of agriculture, instructors in home economics, and for students who wish courses in agricul-

ture and horticulture. The course lasts six weeks, beginning about the first of July and continuing through the month to about the second week in August. All courses offered if successfully completed carry collegiate credit.

The following schedule of courses, offered in 1924, indicates the nature of the work:—

Principles and Methods of Teaching	Geometry
Educational Psychology	Higher Algebra
Principles of Secondary Education	Home Management
Special Methods in Teaching	Materials of General Science
Vocational Agriculture	Mental Tests
Supervised Teaching	Methods of Teaching Home Economics
Professional Improvement Problems	Methods of Teaching Mathematics
Vocational Education	Millinery
Clothing	Methods of Teaching High School English
Design and Practical Arts	Preparatory English
Dramatic Presentation	Problems of Democracy
Floral Arrangement	Public Health
Flower Growing	Recreation
Food Preservation	Review Algebra
Foods	Rural Sociology
Freshman English	Studies in Science
General Science	

THE WINTER SCHOOL

The Winter School has been established for a number of years at the college, and has proved to be very popular with farmers, their wives, sons, and daughters, teachers, college graduates, and others. This school begins about the first of January. Instruction was offered last year in—

Soil Fertility	Supply and Marketing of Farm Products
Field Crops	Sources and Use of Agricultural Credit
Types and Breeds of Live Stock	Botany
Live-stock Feeding	Entomology
Animal Breeding	Farm Structures
Dairy Bacteriology	Farm Motors
Animal Diseases	Rural Sanitary Science and Hygiene
Poultry Diseases	Agricultural Opportunities for Women
Poultry Husbandry	Foods
Fruit Growing	Millinery
Vegetable Gardening	Clothing
Floriculture	Business of the Household
Horticultural Manufactures	Home Care of the Sick
Farm Management	Agricultural Education
Farm Accounts	

A series of special two-week courses in ice-cream making, butter making, milk testing, and market milk are offered. During the two weeks the student devotes all of his time to the work of the special course in which he has enrolled. The instruction lasts throughout the day from 8 to 5. These courses meet a very definite need in the State for those who wish instruction, but who can not attend for a longer period of time, and who do not wish to take other subjects.

DIRECTORY OF INFORMATION

A. The College.

Those desiring college catalogues, the President's annual report, and other pamphlets giving full information relative to entrance requirements, courses of study, expenses, opportunities for student labor, and so forth, should address Ralph J. Watts, Secretary, Amherst, Mass.

All questions regarding admission to the college, either to the freshman class or to advanced standing, should be addressed to Prof. William L. Machmer, Acting Registrar, Amherst, Mass.

B. Experiment Station.

The Experiment Station conducts investigations in as many lines of agricultural science and practice as its funds will permit. It has charge of the inspection of commercial fertilizers, commercial feeding stuffs, and milk-testing apparatus. Branch stations in cranberry and market-garden culture are maintained in other sections of the State.

The station considers the farmers' problems to be its problems, and desires to keep in touch with them.

Requests for bulletins reporting the results of experiments and inspections, and for other information on the work of the station, should be addressed to Sidney B. Haskell, Director of the Experiment Station, Amherst, Mass.

C. The Graduate School.

Questions relating to courses offered leading to the degrees of Master of Science and Doctor of Philosophy, admission and work required, should be addressed to Dr. Charles E. Marshall, Director of the Graduate School, Amherst, Mass.

D. The Extension Service.

Inquiries of a general nature regarding the work of the Extension Service, extension publications, or requests for new lines of work should be addressed to John D. Willard, Director of Extension Service, Amherst, Mass.

E. Short Courses.

For information concerning the Short Courses, the Two-Year Course in Practical Agriculture, the Ten-Weeks Winter School, the Summer Schools, write or apply to Roland H. Verbeck, Director of Short Courses, Amherst, Mass.

Address

The Massachusetts Agricultural College charges a tuition fee of \$60 a term to students who are not residents of Massachusetts. In order to satisfy the college authorities that an applicant is entitled to free tuition they require a statement, signed by the clerk of the city or town in which the applicant resides, certifying to the fact that the father of the applicant is a legal resident of said city or town. Such a statement may be made on the form below. If this is not presented when the student registers, the Treasurer has no option but to collect tuition on the above basis.

MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST, MASS.

MASSACHUSETTS
AGRICULTURAL COLLEGE

THE TEN WEEKS' WINTER SCHOOL

1925



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The Ten Weeks' Winter School

AT THE

MASSACHUSETTS AGRICULTURAL COLLEGE



PUBLICATION OF THIS DOCUMENT

APPROVED BY THE

COMMISSION ON ADMINISTRATION AND FINANCE

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GEORGE F. PUSHEE	Rural Engineering
<i>Instructor in Rural Engineering</i>	
NORMAN J. PYLE, V.M.D.	Veterinary Science
<i>Professor of Veterinary Science</i>	
GEORGE J. RALEIGH, M.Sc.	Pomology
<i>Instructor in Pomology</i>	
VICTOR A. RICE, M.Sc. Agr.	Animal Husbandry
<i>Assistant Professor of Animal Husbandry</i>	
OLIVER C. ROBERTS, B.Sc.	Pomology
<i>Foreman, Pomology Department</i>	
WILLIAM F. ROBERTSON, B.Sc.	Horticultural Manufactures
<i>Instructor in Horticultural Manufactures</i>	
FRED C. SEARS, M.Sc.	Pomology
<i>Professor of Pomology, Head of Department</i>	
EDNA L. SKINNER, B.Sc.	Home Economics
<i>Professor of Home Economics, Head of Department, Adviser of Women</i>	
RICHARD W. SMITH, B.Sc.	Dairying
<i>Instructor in Dairying</i>	
CHARLES H. THAYER	Agronomy
<i>Instructor in Agronomy</i>	
CLARK L. THAYER, B.Sc.	Floriculture
<i>Professor of Floriculture, Head of Department</i>	
WESTON C. THAYER, B.Sc.	Animal Husbandry
<i>Instructor in Animal Husbandry</i>	
PAUL W. VIETS	Short Courses
<i>Supervisor of Farm Placement Training</i>	
WINTHROP F. WELLES, B.Sc.	Agricultural Education
<i>Professor of Agricultural Education, Head of Department</i>	
T. GEORGE YAXIS, M.Sc.	Dairying
<i>Assistant Professor of Dairying</i>	
HUBERT W. YOUNT, B.Sc. Agr.	Agricultural Economics
<i>Instructor in Agricultural Economics</i>	

THE TEN WEEKS' WINTER SCHOOL

December 29, 1924 to March 6, 1925

The Winter School has been maintained by the college for over twenty years. It meets a definite need in providing instruction for groups of men and women who can most conveniently leave the farm during the winter months. The school closes in time for students to return to take up the spring work.

In addition to the regular Winter School, the attention of the student is directed to the following special schools offered during the winter period:—

*The Practical and Scientific Course for Nurserymen.

The Vocational Poultry Course.

The Dairy School.

In order that the Winter School may serve as many people of the Commonwealth as wish to take advantage of it, no entrance requirements have been fixed other than that the student shall be at least eighteen years of age and shall have completed the elementary or common schools. The expenses are very moderate.

The instruction is thorough. The regular faculty teach the Winter School, assisted, if necessary, by additional instructors and lecturers from outside.

There are no required courses. The advice of the faculty in regard to the course may be had, but the students are left free to select the courses in which they are interested.

A social program is arranged for the Winter School in order that students may enjoy the advantages of college life. One of the most pleasant features of the Winter School in previous years has been the strong group spirit developed through wise leadership on the part of the student body.

The college does not guarantee positions, but frequently has calls for capable, energetic men and women with farm experience. Students interested in securing positions should consult the Supervisor of Farm Placement Training early in the winter. Employers who wish to secure the services of reliable men are also advised to take the matter up directly with the Supervisor of Farm Placement Training in the Short Course Office.

TUITION, FEES AND EXPENSES

There is no tuition in the Winter School, but each student is required to pay to the Treasurer a \$5 registration fee. There are no laboratory fees in connection with any of the courses. The registration fee, unless sent in advance, must be paid at the time of registration to the Treasurer of the college.

Board may be obtained at the college dining hall for approximately \$7 a week. Rent for furnished rooms in private houses varies in price from \$2.50 to \$4 a week for each occupant. There is room for a limited number of women students in the new women's dormitory. Make application for reservation immediately to Miss Edna Skinner, dean of women, Massachusetts Agricultural College.

Women students board at the College Dining Hall which costs \$7.00 a week, making the total cost for board and room \$10.00 a week.

REGISTRATION

Students will be registered in classes Monday, December 29, at the Short Course Office. Classes will begin Tuesday, December 30, at 8 o'clock A.M.

Each student wishing to register for the Winter School must furnish in advance the names and addresses of two citizens who will recommend him as to moral character.

Upon arrival the student should report at the office of the Director of Short Courses, located in South College; telephone 424.

RULES AND REGULATIONS

The choice of subjects is left to the student, but students are advised to elect not less than ten nor more than twenty-five hours per week. All variations from this rule must be approved by the Director of Short courses.

* Complete description of this course will be forwarded upon request.

A class that meets for one hour a day for five days per week is reckoned as five credit hours. A two or three hour laboratory period counts as one class hour.

Information in regard to books used in the various courses will be given by the instructors at the first meeting of the class. The necessary textbooks may be purchased at the Treasurer's office.

As a guide to those who come to the college for the first time, the following extracts are taken from the regular rules of the college:—

The customary high standard of college men in honor, manliness, self-respect and consideration for the rights of others constitutes the standard of student deportment.

It should be understood that the college, acting through its president or any administrative officer designated by him, distinctly reserves the right not only to suspend, but also to name conditions under which students may remain in the institution.

Regularity of attendance and conformity to general college rules are required of all Winter School students.

THE LIBRARY

The college library occupies the entire lower floor and basement of the Chapel-Library building. It contains more than 60,000 volumes in addition to a large number of unbound periodicals and pamphlets. Works on agriculture, horticulture, botany, entomology, and the various sciences predominate, but literature, history, economics, and sociology are well represented and receive due attention. In addition to a few newspapers and the best farm papers, the reading room is supplied with a good variety of popular periodical literature, encyclopedias, and general reference books. The equipment is such that the library ranks extremely well with the agricultural libraries of the country.

An agricultural reference library is maintained in Stockbridge Hall. Other branch libraries and reading rooms are provided in the department buildings, and these are open for the use of the Short Course and regular college students.

The library hours are from 8 A.M. to 9.30 P.M. every week day, and from 10 A.M. to 1 P.M. on Sunday in term time. Shorter hours prevail during the vacation season.

Short Course students should be able to find excellent material for their lines of work, and are cordially invited to make use of the library and its equipment. The librarian and library assistants are always on hand, ready and willing to be of assistance.

THE INFIRMARY

The college maintains an infirmary for the care of sick or injured students. Students are urged to go to the infirmary when in need of the services rendered by the resident nurse or by a physician. Inasmuch as the physical director gives special attention to all student diseases, it is to be expected that students will go to the infirmary at his suggestion.

The infirmary fee is \$2 a day, and will be charged when one or more meals are obtained at the infirmary, or when the student remains at the infirmary for one or more nights.

SCHOLARSHIPS

The Jewish Agricultural and Industrial Aid Society of New York instituted in 1908 a system of free scholarships to enable the children of Jewish farmers to attend the short winter courses offered by the agricultural colleges in the states in which they reside. The scholarships are awarded by competition, which consists in the writing of a brief essay on an agricultural topic. Children of Jewish farmers living and working on the farms of their parents are eligible to compete for these scholarships.

Applications for these scholarships should be made to The Jewish Agricultural and Industrial Aid Society, 174 Second Avenue, New York City.

POSITIONS

A student desiring a recommendation from the college must meet the following conditions:—

1. He must be of good character.
2. His previous record must be good.
3. His work in all courses must be satisfactory.

Students who have not previously had a considerable amount of farm experience cannot, as a rule, be recommended for positions of responsibility. This is especially true for the better positions for which managers or superintendents are wanted.

DESCRIPTION OF COURSES

GENERAL AGRICULTURE

Soil Fertility

A course in which the origin of soils, their properties and management, will be studied. Emphasis will be placed on: the control of soil moisture; tilth and tillage; importance and maintenance of soil organic matter; manures,—their composition, value, preservation, and use; limes and liming; and the properties and use of commercial fertilizers. Two class hours and one two-hour laboratory period.

Mr. C. H. Thayer and Assistant Professor Lamphear

Field Crops

The production of field crops for New England; species and varieties, agricultural characteristics, methods of culture, rotations, harvesting and curing. The laboratory work gives the student practice in seed selection and testing for quality, purity and germination, and in corn and potato judging. Course 1 required. Two class hours and one two-hour laboratory period a week.

Assistant Professor Michels

Tobacco Growing

A short course dealing with the practices of growing tobacco in the Connecticut Valley, and designed especially for those expecting to go into the tobacco industry. The crop from the seed bed to the market will be studied and special problems of soil, commercial fertilizers, green manures and tobacco diseases and insect pests will be considered. 4 class hours per week.

Assistant Professor Lamphear

Types and Breeds of Live Stock

Outlines of the market classes and grades of beef cattle, horses, sheep, and swine, placing emphasis upon the characteristics of each class and its adaptations. The characteristics, the adaptations, and so far as is possible the historic development of each of the more important breeds of live stock are also carefully studied, as well as their distribution in America. Special emphasis is laid upon dairy cattle and horses in the judging work. Three class hours and two two-hour judging periods a week.

Mr. W. C. Thayer

Live Stock Feeding

A study of the physiology of nutrition, the composition of feedstuffs, and of rational economic feeding. The feeding of dairy cattle and their management for profitable milk production receives first attention. Similarly, the feeding of horses, of beef cattle, of sheep, and of swine is studied. Three class hours a week.

Assistant Professor Glatfelter

Animal Breeding

A discussion of the more common problems pertaining to the breeding of live stock, their explanation and solution; in-breeding; cross-breeding; grading. The work of the most successful men in history is studied. Time is given to the study of pedigrees of the different breeds of dairy cattle and other stock. Three class hours.

Assistant Professor Rice

Dairy Bacteriology

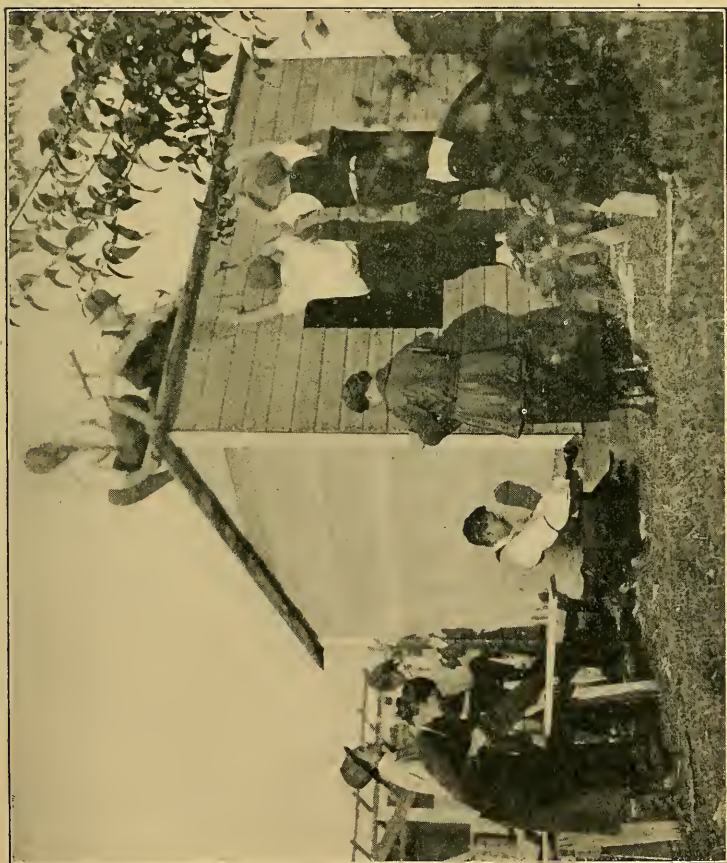
The characteristics and functions of bacteria and their relation to the different branches of the dairy industry. The scientific basis for cream ripening, sterilization, pasteurization, control of fermentation, and the production of the best



Mixing fertilizer



Studying field crops



Constructing a poultry house

quality of market milk. Two class hours and one two-hour laboratory period a week.

Professor Marshall and Miss Garvey

Animal Diseases

This course acquaints the student with the more common diseases to which domesticated animals are susceptible. Particular attention is given to conditions favoring diseases, to communicable diseases, and to prophylactic measures, in order that the student may be able to reduce the prevalence of diseases among animals in his charge. Five class hours a week.

Dr. Lentz

Poultry Diseases

This course is planned for students specializing in poultry work. Anatomy and physiology of the domestic fowl are briefly considered, and particular attention is devoted to the diseases which may cause heavy losses in the flock. Prevention rather than cure is emphasized. Five class hours a week.

Dr. Pyle

Poultry Husbandry

This course meets the needs of those who can spend only a short time at the college, but who wish to get a general survey of poultry keeping and some technical knowledge of the latest and most scientific methods in vogue. It is a lecture and laboratory course, the former covering opportunities in poultry culture, poultry housing, winter egg production, incubation and brooding, feeds and feeding, poultry management, and the most popular methods of marketing poultry and eggs in Massachusetts. The laboratory work consists of demonstrations and practical work in killing, picking, caponizing, judging and culling for egg production, and studying types and construction of incubators and brooders. Practical work in operating incubators is given to as many as can be accommodated. The large poultry plant furnishes facilities for demonstrating various methods of housing and feeding. A splendid opportunity is afforded those who have time for observation work outside of class hours. Five class hours and one two-hour laboratory period per week.

Assistant Professor Banta

Vegetable Gardening

The successful commercial production of vegetables requires a clear understanding of the problems that the vegetable grower meets. Practical contact is made with the problem in so far as the season of the year and time devoted to the work permit. Classroom instruction makes clear the fundamental principles underlying the problem, and gives opportunity for discussion. The laboratory periods aim to give the student practice in applying the fundamental principles to the problems he is to meet as a commercial vegetable grower. Some of these will be discussed under the leadership of market gardeners and specialists.

Students electing this course are required to take soil fertility and it is recommended that they take botany and entomology. Three class hours and two two-hour laboratory periods a week.

Ten Weeks Winter Course in Fruit Growing

A specialized course in fruit growing intended for persons who are interested in the growing of fruit for profit.

The work will require practically all of the student's available time while at the college and every student is expected to take all the courses offered.

Enrollment is limited to fifteen students.

Table of Required Courses

	Course	Class hrs.	Laboratory periods	Total credits
I	Tree Fruits	4	1	5
II	Pruning	2	2	4
III	Spraying	3	1	4
IV	Small Fruits	3		3
V	Harvesting and Marketing	2	2	4
VI	Farm Motors	3	2	5

Description of Courses

I. *Tree Fruits.*

A study of varieties, propagation, planting, fertilizing and soil management of apples, peaches, pears, plums and cherries.

Four class hours and one two-hour laboratory periods per week.

Mr. Roberts

II. *Pruning Tree Fruits.*

A consideration of the principles and practice of pruning the various tree fruits, including such questions as the methods of fruit bearing, the best season of the year for pruning, how wounds heal, dressings for wounds, formation of fruit buds, pruning tools, care of top-worked trees.

Two class hours and two two-hour laboratory periods per week.

Prof. Drain

III. *Spraying.*

A study of spraying machinery (pumps, nozzles, hose and gas engines); the purchasing, preparation and use of spray materials; the best methods of applying; and methods of controlling the various pests of the tree fruits.

Three class hours and one two-hour laboratory periods per week.

Mr. Raleigh

IV. *Small Fruits.*

Choice of varieties, methods of planting, cultural care, pruning, spraying, harvesting and marketing of raspberries, blackberries, currants, gooseberries, strawberries and grapes. Three class hours per week.

Prof. Sears

V. *Harvesting and Marketing.*

The handling of fruit from the time it is picked until it reaches the ultimate consumer, including picking, grading, packing, storing and marketing.

Two class hours and two two-hour laboratory periods per week.

Mr. French

VI. *Farm Motors.*

(As given by Rural Engineering Dept.)

Floriculture

This course is outlined primarily for students who are interested in commercial floriculture. Some of the subjects considered are: greenhouse construction and heating, greenhouse management, culture of the important commercial crops, and floral arrangement. A portion of the course will be devoted to a consideration of gardening and garden flowers. Special trips are taken to study floricultural establishments in the State; students desiring credit for the course are required to take these trips. A series of lectures will be given by men who are engaged in various phases of floricultural work. Students taking this course are required to take soil fertility, and it is recommended that they take fruit growing and vegetable gardening. Five class hours a week; laboratory work or field trips on Saturday.

Professor Thayer, Assistant Professor Muller and Mr. Hubbard

Horticultural Manufactures

The utilization of culls and low-grade fruits and vegetables, and the marketing of excess crops are always serious problems to the producer. The economic conversion of these materials into palatable nutritious food products is becoming a greater necessity each year.

This course aims to place before the student the fundamental principles underlying the various means of food preservation and the manufacturing of food products.

The canning, drying, and storage of fruits and vegetables, together with the manufacture of many of their products, will be studied in detail, and the methods illustrated with laboratory exercises. Students will be given opportunity to do canning and drying, to manufacture many fruit and vegetable products, and to investigate storage conditions. The work in both classroom and laboratory will

be of such a character as to be readily applied in the home or in the farm factory. Two class hours and two laboratory periods per week. Class limited to sixteen students.

Mr. Robertson

Farm Management

A study of some of the problems of modern farming and the factors that influence success, such as the choice of a region and of a farm, types of farming, size of farm, rotation of crops, and labor problems. Two class hours a week.

Professor Foord

Farm Accounts

Actual practice in the use of a simple system of farm accounting, including cost accounts suitable for the large or the small farm. Two two-hour laboratory periods a week.

Professor Foord

The Supply and Marketing of Farm Products in Massachusetts

Marketing Farm Products.—A critical description of the methods of selling and handling farm products used by successful New England farmers and farmers' associations. Among the problems to be considered are those of grading, storing, transporting, factors influencing prices, and the importance of efficient marketing in increasing farm income. Two class hours per week.

Mr. Yount

Botany

A study of the structure, functions, and diseases of greenhouse, garden, orchard, and field crops, together with methods of disease prevention, including spraying and the application of fungicides. Two class hours a week.

Assistant Professor McLaughlin

Entomology

The course in entomology covers the topics outlined below. It is aimed to cover the fundamentals of the subject rather fully. Time will permit the discussion of only the more important of the injurious and beneficial insects with which we have to deal in this section of the country.

1. Insects and their nearest relatives—how to distinguish them.
2. Structure or make-up of insects and the practical application of this knowledge in insect control.
3. Development, metamorphoses (changes), and stages of insect life.
4. Composition, preparation, combination, and use of insecticides, fumigants, etc.
5. Spraying apparatus and its use.
6. Beneficial and injurious insects.
 - A. The life history, habits, behavior and control of some of the most important insect pests.
 - B. Beneficial insects.

Three class hours a week.

Assistant Professor Alexander

Farm Motors

This course deals with the gasoline engine as used for stationary work, automobiles, and tractors. Instruction is given by means of lectures and textbooks, and by operating and repairing stationary engines, automobiles, and tractors. Special attention is given to overhauling and repairing. Three class hours and two two-hour laboratory periods a week.

Professor Gunness and Mr. Pushee

Rural Sanitary Science and Hygiene

Significance of sanitary science in the relation to health; the theories of disease; air and ventilation; water and its protection; sewage disposal and purification; foods, their care, preservation, decomposition, and nutrition; vaccines and serum treatment; carriers of disease, immunity, and susceptibility; infectious diseases; disinfection and care of infectious diseases. Two class hours a week.

Professor Marshall

Agricultural Opportunities for Women

A course for the woman who is interested in agriculture and who wishes to know what opportunities are open to her in that field. A study will be made of the types of agricultural work for which women are best adapted; of the special problems which will confront them in such work and how these may be met. Two class hours per week.

Miss Hamlin

HOMEMAKING

Owing to the increasing demand for instruction in homemaking provision has been made in the Winter School for a course combining homemaking with agriculture.

There are many women and girls throughout the State who are vitally interested in studying home problems and at the same time would like to become proficient in some phase of agriculture, as poultry, gardening, floriculture, or fruit growing. The college is able to extend this unusual opportunity.

Attractive laboratories equipped for homemaking work will be at the disposal of all women students in the Winter School.

Foods

When one realizes that a large percentage of the family income must be spent for food, it is easy to understand that this is one of the most timely topics of the day in the interest of thrift and health.

Special study will be made of the needs of the body and the selection of foods to supply those needs; also care in the handling and keeping of foods. Emphasis will be given to the application of fundamental principles in planning balanced menus. An unwise selection of foods may result in malnutrition rather than in health.

Consideration will be given also to such problems as infant feeding and school lunches. This course will include laboratory work of practical value. Two class hours and two two-hour laboratory periods per week.

Miss Knowlton

Clothing

Consideration will be given to making over and extending the use of fabrics as well as the selection of new materials. Their character, cost, and durability are studied with reference to planning a wardrobe for a limited income, emphasizing the beauty of simplicity and suitability. There will be practical work in sewing and making garments. Two class hours and two two-hour laboratory periods per week.

Miss Bartley

Millinery

The selection of color and form as related to the individual, the wardrobe, the occasion and the season will be given careful attention. Laboratory work will include covering of hat frames with velvet, silk, net and straw; lining and finishing; trimmings, bows, pleatings, hand-made flowers, together with pressing and renovating materials. One class hour and two two-hour laboratory periods per week.

Miss Bartley

The Business of the Household

Good management is a science. For generations women have failed to apply to the business of homemaking many efficient methods so successfully used in the business world.

Since the homemaker is largely responsible for all expenditures connected with the house, an important consideration in this course is the study of the family budget, the apportionment of the income, and the keeping of accounts.

Equally important is the standardization of household tasks, the study of systematic methods of work, selection and care of equipment, the use of time and labor-saving devices. Three class hours per week.

Miss Skinner



Table decoration by the class in floriculture



A course in the cooking school

Home Care of the Sick

Health preservation and home care of the sick are of prime importance. It should be far easier to keep well than to become sick, provided one understands the fundamental principles of hygiene, thus insuring the care of family health.

Every homemaker needs some knowledge of home care of the sick, including the study of simple diseases and their prevention, the care of young children and invalids, and first aid to the injured. Three class hours per week.

VOCATIONAL AGRICULTURAL TEACHING

The Massachusetts Agricultural College has been designated by the Massachusetts Department of Education as the institution for training teachers of vocational agriculture for the State. The work is being carried along the following lines:—

1. Regular college courses, four or five years, leading to a degree.
2. Shorter courses to supplement the training of more mature men who are partly qualified through practical experience, or through scientific study of agriculture, or through study of methods and principles of education, or through teaching experience.
3. Professional improvement training for employed teachers in regular college courses, courses in the winter term, or courses specially organized on request of a sufficient number of students.

The Winter Short Course period provides in part for the second and third lines. An intensive course during the first two weeks is provided for the instructors who may leave their teaching for only a brief period. This course may be continued on a higher schedule for such persons as may be able to remain throughout the winter term.

For all of these there will be an opportunity to take courses in general agricultural teaching, special Massachusetts problems, and agricultural subject-matter. An attempt will be made to furnish any subject-matter course which enough men may request.

High school principals and science teachers who have had farm experience, or practical agriculturists, may find this an opportunity to qualify for vocational teaching,—a field in which the demand is fairly strong.

The educational courses supplemented by an adequate amount of agriculture will be credited by the Department of Education towards approval of candidates or for professional improvement programs. Similar courses are offered in the summer school.

The following courses have proved to be of greatest benefit to those enrolled at this time:—

Principles and Methods of Teaching

The aim of this course is to present the fundamental principles of teaching as applied to high school students. It treats such topics as interest, apperception, imaging, reasoning, and other activities of the mind in its learning processes, and endeavors to apply the study of these in each student's case in order that he may learn to promote such mind activities in others. Such matters as discipline, lesson plans, teaching efficiency and other topics of general method are thoroughly handled and illustrated work done. Five class hours per week.

Professor Glick and Professor Welles

Special Methods in Vocational Agricultural Teaching

This course consists of intensive work on the important principles underlying the successful teaching of vocational agriculture and a thorough study of the special plans and activities of the teacher of this subject. The job is analyzed to determine what the teacher must know as to character, setting, technique, and relations of his work. All available sources are consulted for information as to State requirements, industrial conformity, and professional ideals. Illustrative material showing how particular departments and schools work out their problems in this subject is gathered and studied. Plans for the year's work, unit study and daily lessons are worked out on the home-project basis. Special lessons are planned and taught by students in moot class.

In case both experienced and untrained men apply for this course, the group may be divided into two sections. Five class hours per week.

Professor Welles

Agricultural Teaching Improvement Problems in Massachusetts

A seminar course for employed teachers or directors of vocational agriculture, dealing with problems which constantly arise in the agricultural schools of the State. Prospective teachers may be admitted by special arrangement. Includes plans for the coming season, and campaigns for improved methods based on experiences and needs of men in service; for this season special emphasis on summer teaching of related subjects, and the proper approach to teaching a vocational topic.

Class meets for double periods five days each week for two weeks. The class will continue for a longer term at four days each week if there is a sufficient demand.

Mr. Heald

NURSERY PRACTICE—PRACTICAL AND SCIENTIFIC COURSE FOR NURSERYMEN

December 29, 1924 to March 6, 1925

A special course for men engaged in nursery work will be offered in 1925. This course is provided at the request of the New England Nurserymen's Association and under the immediate direction of the standing committee on education of that society. The plan has the support and co-operation of the Massachusetts Nurserymen's Association and the Connecticut Nurserymen's Association.

This course of ten weeks follows the same general plan as the Ten Weeks' Short Course, and is, in fact, a part of the regular Winter School, the students of the Nursery Course having all advantages and privileges of the Winter School, but with studies especially adapted to the needs of the nursery workers.

WINTER SHORT COURSES IN DAIRYING

January 6 to March 14, 1925

STAFF OF INSTRUCTION, 1925

H. F. JUDKINS, B.Sc., *Professor of Dairying*
T. G. YAXIS, M.Sc., *Assistant Professor of Dairying*
H. L. PENDLETON, B.Sc., *Instructor in Dairying*
R. W. SMITH, B.Sc., *Instructor in Dairying*

In addition to the above, specialists in the commercial field will be secured to help with the laboratory work and discussion.

CALENDAR, JANUARY 6, 1925 to MARCH 14, 1925

- Course I. Testing Milk and Its Products, Tuesday, January 6, 8 a.m., to Saturday, January 17, 12 m.
- Course II. Ice-Cream Making, Tuesday, January 20, 8 a.m., to Saturday, January 31, 12 m.
- Course III. Milk Plant Operation, Tuesday, February 3, 8 a.m., to Saturday, February 14, 12 m.
- Course IV. Repetition of Course II., Tuesday, February 17, 8 a.m., to Saturday, February 28, 12 m. (This course is for those without previous experience in testing milk and its products.)
- Course V. Milk Inspection, Tuesday, March 3, 8 a.m., to Saturday, March 14, 12 m.

GENERAL INFORMATION

A series of five ten-day courses in dairying will be conducted between January 6 and March 14, 1925. The courses cover the principal subjects connected with the handling of milk or with the making of milk products. Courses of this type were conducted in 1923 for the first time and they seemed to meet



Nursery practice



Class work in greenhouses

the demand for short course instruction along these lines, which has come in recent years from creamery, market milk, and ice-cream plant operators and workers.

The course in milk inspection is offered for the first time this year and is the result of work with a committee of the Massachusetts Milk Inspectors Association appointed to help organize such a course.

Many a plant manager, foreman, or worker would do better work and get more satisfaction out of his work if he understood the reasons for doing certain things. It is the man who wants to know more about his work, and who is anxious to become expert enough to advance in it, that plant operators can more profitably encourage to take these courses. Owners of dairy plants sending men of this type will profit principally thru the fact that the men will learn economy of operation resulting in a saving of labor, and better handling and processing methods resulting in a better and more uniform product. The courses are purposely given at a time of year when help can most easily be spared.

The courses are intended not only for experienced plant men but for men having little experience. Those who are inexperienced should plan to take all of the courses. Farm men and women who are responsible for milk handling, butter making, or the making of soft cheese will also find these courses adapted to their needs.

The courses are so arranged that a student can report for the first on January 6 and take all the courses in succession, finishing February 14, or he can take any course separately. There are no prerequisites in any course except Course II. More can be accomplished in a ten-day course in ice-cream making if the student understands testing. To be eligible for Course II. The applicant must have had testing experience, either by having taken Course I or by having gained it in another course at this or some other institution. Course IV will be practically the same as Course II except more time will have to be given to testing. This course is given for those without testing experience. A certificate showing the subject studied is given at the end of each course to those doing satisfactory work.

Admission.—There are no entrance requirements except that the student must be eighteen years of age, and must have a common school education.

Registration.—Students should enroll by mail. A registration card will be sent upon application.

Enrollment for Course I, "Testing Milk and its Products" must be made by January 5, 1925. Those failing to enroll by mail may enroll on January 5. Students should arrive January 5, as classes begin at 8 a.m., January 6.

Enrollment for Course II, "Ice-cream making" must be mailed so that it will arrive in Amherst not later than January 10. Fifteen students are all that can be registered in this course at one time and the first fifteen to enroll will be scheduled for the course. Enrollment for Course IV, "Ice-cream making" must be mailed so that it will arrive in Amherst not later than February 10. Enrollment for Course III, "Milk Plant Operation" must be made by February 2, as classes begin at 8 a.m., February 3. Enrollment for Course V, "Milk Inspection" must be made by mail or in person not later than 5 p.m., March 2.

All applications for entrance to these courses should be addressed to the director of Short Courses, Massachusetts Agricultural College, Amherst, Mass.

Upon arrival the student should report at the office of the Director of Short Courses in South College, telephone 424, for information concerning rooming accommodation:

Tuition, Fees and Expenses.—There is no tuition fee in connection with any of the courses, but each student is required to pay the Treasurer a registration fee of \$2. per course. This must be mailed with the registration card.

Students will need white suits for laboratory work, and may wish to purchase one or more textbooks for each course.

Board may be obtained at the college dining hall for approximately \$7. a week. Rent for furnished rooms in private houses varies in price from \$2.50 to \$4. a week for each occupant.

Positions.—The dairy Department is often called upon to recommend candidates for positions, and stands ready to recommend those who take these courses with the idea of getting positions, providing they are of good character, have good previous records, and do satisfactory work in the courses.

Methods of Instruction.—Instruction is given (1) by lecture, by recitation and discussion, and by the working out of problems: (2) by practical work in the laboratories. In general, two one-hour periods each day will be allowed for discussion and two three-hour periods for laboratory work. The student is expected to give practically the entire day from 8 a.m., to 5 p.m., to his work. The services of the entire department are available at different times for men taking these courses.

Flint Laboratory.—The dairy building is practically new, and with its equipment stands as one of the best college dairy buildings in the country. The testing laboratory is spacious and is well equipped for testing milk and its products. Equipment includes a Mojonnier Tester. About 1,000 quarts of milk are received daily, and the market milk department is equipped to weigh, clarify, pasteurize, cool and bottle this milk.

There is a ten-ton compression refrigerating system in the building arranged for making ice, freezing ice cream and cooling the ice-cream hardening box. The ice-cream room contains two brine freezers and one tub freezer, a mixing tank, emulsing and viscolizing outfits, a filling machine, and other smaller equipment. The butter department is equipped with power and hand churns of different makes, starter-making equipment, pasteurizers, and various makes of separators. The cheese room is equipped to make cheese of all kinds, and especially soft cheese.

DESCRIPTION OF WINTER COURSES

Course I. Testing Milk and its Products (January 6-17).

This course is designed to fit men and women to test milk and its products in various kinds of dairy plants, or to supply some new information to those now engaged in this work. Those who do satisfactory work will be eligible to secure a state testing certificate.

Lecture and discussion topics include the magnitude of the dairy industry, secretion of milk and its composition, factors affecting the percentage of fat in milk, the sampling of milk, the Babcock test for milk and its products, the use of the lactometer, the acid tests, moisture and salt testing of butter, and total solid tests for condensed milk and ice cream including the Mojonnier test.

Practical application of the lecture and discussion work will be carried out in the laboratory, and all the common tests of milk and its products will be performed.

Course II. Ice-Cream Making (January 20 to January 31).

This course aims to present the most up-to-date information on ice-cream making and fit men to operate or take charge of operating any part of the ice-cream business.

Lectures and discussions will cover the selection of ingredients for the mix, standardizing and calculating the mix, processing the mix, factors influencing the yield, causes and remedies of ice-cream defects, the manufacture of brick ice cream, special ice creams and fancy molds, marketing ice cream, and the handling of ammonia refrigerating plants.

Laboratory exercises will include work on the whipping properties of different creams, tests of ingredients used in the mix, study of ice-cream equipment and its operation, calculating and making up of the ice-cream mix, effect on the quality of ice cream of such factors as fat content, solids not included in the fat content, temperature of the mix, temperature of brine, age of the mix, speed of the dasher, treatment of the cream or mix, and making various kinds of frozen delicacies.

Course III. Milk Plant Operation (February 3 to February 14).

This course is designed to help milk plant employees to a better understanding of economy of operation and uniformity of product. It will help prepare men to be foremen and superintendents in milk plants.

Some of the lecture and discussion topics are: general scope of the market milk industry, value of milk as a food, relation of bacteria to milk, sanitary production, marketing; plant construction and selection of equipment, processing, delivery, handling surplus, standardizing, grading and labeling, and care of milk in the home.

Laboratory exercises will cover milk sampling, the scoring of dairies, cream line problems, the scoring of milk, the study of milk plant equipment, milk processing, the manufacture of cottage, neufchatel, and cream cheese and butter.

Course IV. Ice-Cream Making (February 17 to February 28).

Repetition of Course II for those without previous experience in testing milk and its products.

Course V. Milk Inspection (March 3 to March 14).

This course is primarily for the purpose of disseminating new facts to milk inspectors that they may get more satisfaction out of their work. Those contemplating becoming inspectors will also derive much benefit from the course. Lecture, discussion and laboratory work will cover the bacteriology of milk and its relation to the public health, sampling milk and ice cream and butterfat and total solid tests for same; tests for adulteration, study of farm practice in handling milk and methods of inspection, processing milk and inspection of milk plants.

THE TWO-YEAR COURSE IN PRACTICAL AGRICULTURE

The Two-Year Course in Practical Agriculture is intended for men and women who desire a working knowledge of the best methods in farming but who cannot spend four years in college. An applicant for admission must be at least 17 years of age and must have a common school education.

Tuition is free to residents of Massachusetts; others are charged \$60.00 per term, or \$180.00 per year. All students must pay small laboratory fees in several courses.

The course is so organized that each student specializes along one of the following lines: animal husbandry, poultry, dairy manufactures, general horticulture, fruit growing, floriculture, or vegetable gardening. Each specialized course is intensive, with emphasis on practical work under competent supervision. It covers two winters and the intervening summer. The first year is made up of six months of study at the college followed by six months of practical farm experience on selected farms. Nine months more of study at the college completes the course. Each student, at graduation, receives a certificate showing the subject studied.

THE ONE-YEAR VOCATIONAL COURSE IN POULTRY HUSBANDRY

December 29, 1924 to December 18, 1925

Enrollment in the Vocational Poultry Course is limited to twelve students. Applications for this course should be made early.

The institution of the One-Year Vocational Course in Poultry Husbandry is to meet the needs of those who wish to specialize in this branch of agriculture and devote practically all of their time to it, and who feel they cannot spend either two or four years in college.

Entrance Requirements.—Applicants must be at least eighteen years of age and have a good elementary education.

Fees.—There is no tuition for residents of Massachusetts, but a laboratory fee of \$5 is required for the spring term, and the same for the fall term.

The material for this course has been carefully selected from the various courses for the four-year students. Use is made of the very practical portions, but enough of the more scientific work is given to enable the student to get a thorough grasp of the "whys and wherefores" of the subject. The former has been much enlarged upon, and an immense amount of practical laboratory work

in care and management of poultry is required. "Learn to do by doing" is the slogan for this course. The aim is to develop as much skill as time will permit.

The general plan is as follows:—

Winter Term.—The student takes Course 1, outlined below, and in addition, farm accounts, avian pathology, agricultural economics, poultry husbandry, rural sanitary science, and hygiene. The student may elect either fruit growing or vegetable gardening. This plan brings the student in contact with other members of the faculty, and acquaints him with important correlated work.

Spring Term.—From early April until college closes, in June, the student takes Courses 1, 4, 5 and 7, devoting all his time to poultry work.

Fall Term.—The student continues Courses 1, 5 and 7, and in addition takes Courses 2 and 3, still devoting all his time to poultry work.

Course of Study

Course 1. Elementary Poultry Keeping.—A textbook course supplemented with lectures, recitations, etc., covering the entire field of elementary poultry keeping, special emphasis being laid upon the following subjects: opportunities in poultry keeping, poultry house construction, feeds and feeding, breeds and breeding, incubation, brooding, growing stock, poultry farm management, and poultry diseases. Five recitations per week throughout the year.

Course 2.—A practical laboratory course covering the following subjects: carpentry, fattening, killing, picking, dressing, caponizing, avian anatomy and physiology, making and applying disinfectants and lice powder, also identification and study of poultry feeds, etc. Two laboratory periods per week from October until December, inclusive.

Course 3. Poultry Judging.—Fall term. This course embodies the latest methods of judging egg production capacity by external characters as approved by the American Association of Instructors and Investigators in Poultry Husbandry; the history and evolution of our breeds and varieties of domestic fowl, their standard qualities, and their preparation and judging for exhibition purposes. In the latter portion of the course the "American Standard of Perfection" is used as a text. Two two-hour laboratory periods.

Course 4.—A practical laboratory course in incubation, brooding, and growing stock, equivalent to five laboratory periods per week from March to June, inclusive.

Course 5.—A conference, observation, and general reading course equivalent to one or two recitations per week during the fall and spring terms. In this course the student will become thoroughly acquainted with the best literature on poultry subjects through books, station bulletins, scientific articles, poultry magazines, etc. A thorough discussion of the problems met by the practical poultrymen is a strong feature of this course.

Course 6. Poultry Management.—A general poultry practice course in the care and management of poultry, the work to be done morning, noon, and night, and other periods as necessity requires, the class to be responsible for the work in caring for specified flocks under the supervision of instructors from April until college closes, and from October until December, inclusive.

Course 7. Elements of Poultry House Designing.—This course embraces the elements of mechanical drawing and the principles of designing; and special attention is given to the preparation of plans for all kinds of poultry buildings, including incubator cellars, brooder, laying, breeding, and growing houses; also feed hoppers, trapnests, and other equipment. Two two-hour laboratory periods per week. Credits, 2.

SUMMER SCHOOL

The Summer School at the Massachusetts Agricultural College has been a feature of the short course work for the past seventeen years.

In 1924 for the first time the school was operated on a college credit basis, only graduate and under-graduate work being offered. The school opened June

28th and ran for a period of six weeks, closing August 8th. The following courses were offered:

Collegiate Courses

Education
Home Economics
Science and Allied Subjects

Freshman and Preparatory Courses

Sub-freshman courses for college entrance credit:
English, Algebra, Composition

Courses in Education and Allied Subjects

Methods of teaching English in the High School
Method of Teaching and Supervision of Mathematics
Educational Psychology
Mental tests
Principles and Methods of Teaching
Special Methods in Teaching Vocational Agriculture
Supervised Teaching
Principles of Secondary Education

Courses in Home Economics

Clothing
Millinery
Foods
Methods of Teaching Home Economics
Home Management

Science and Allied Courses

Food Preservation
General Science
Studies in Science
Public Health
Problems of Democracy
Rural Sociology
Dramatic Presentation
Design and Practical Arts
Floral Arrangement
Flower Growing

THE MASSACHUSETTS AGRICULTURAL COLLEGE

TEN WEEKS' WINTER SCHOOL

Application for Enrollment

I hereby make application for admission to the Ten Weeks' Winter Courses which are to begin Dec. 29, 1924. I am enclosing the registration fee of five dollars (\$5) in cash, check, or money order. (Designate which one.)

Name (Mr., Mrs., or Miss)

Home address

Date of application

My choice of courses is as follows: —

1 3 5

2 4 6

.....

Kindly give us the names and addresses of two persons to whom we may refer for a statement of character.

1

2

Mail this blank, enclosing fee, to Director of Short Courses, Massachusetts Agricultural College, Amherst, Mass. Checks or money orders should be made payable to the Massachusetts Agricultural College.

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